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| **Course Code** | **17AG1006** | **Duration** | **3hrs** |
| **Course Name** | **CROP PHYSIOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name a C3 plant. | | CO4 | R | 1 |
| 2. | Outer layer of leaf cells is ………………. | | CO1 | R | 1 |
| 3. | The inner fluid of Chloroplast is called…………… | | CO1 | R | 1 |
| 4. | Mango is a climatric fruit. True/False | | CO4 | R | 1 |
| 5. | Name the process of movement of water from higher concentration to lower concentration. | | CO2 | R | 1 |
| 6. | The unit of water potential is…………. | | CO1 | R | 1 |
| 7. | List two steps in respiration. | | CO4 | R | 1 |
| 8. | The mineral ion associated with stomatal opening is …………….. | | CO3 | R | 1 |
| 9. | Name any one physiological disorder of fruits. | | CO3 | R | 1 |
| 10. | List one function of phosphorous in plants. | | CO3 | R | 1 |
| 11. | State two physiological parameters used to measure plant growth. | | CO5 | R | 1 |
| 12. | Name the hormone responsible for cell division. | | CO6 | R | 1 |
| 13. | Water moves through……………… cells in the plant. | | CO2 | R | 1 |
| 14. | The first CO2 acceptor in C3 plants. | | CO4 | R | 1 |
| 15. | Breakdown of fatty acid is called…………….. | | CO4 | R | 1 |
| 16. | Whip tail of cauliflower is due to ………… deficiency. | | CO3 | R | 1 |
| 17. | The actively growing cell is called………………... | | CO1 | R | 1 |
| 18. | List two minor elements. | | CO3 | R | 1 |
| 19. | Name the scientist that discovered auxin. | | CO6 | R | 1 |
| 20. | The fruits that ripen after harvesting are called……………. fruits. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the structure of nucleus with a neat labelled diagram. | | CO1 | U | 5 |
| 22. | Distinguish between C3 and C4 photosynthesis. | | CO3 | An | 5 |
| 23. | Describe any two growth parameters used to measure crop growth. | | CO5 | U | 5 |
| 24. | Explain glycolysis with a neat flow chart. | | CO4 | U | 5 |
| 25. | Interpret the statement transpiration is a necessary evil. | | CO3 | A | 5 |
| 26. | Discuss the various changes during fruit ripening. | | CO6 | U | 5 |
| 27. | Explain the TCA cycle. | | CO4 | U | 5 |
| 28. | Describe the physiological role of Gibberellins in plants. | | CO6 | U | 5 |
| 29. | Describe the process of seed germination. | | CO4 | U | 5 |
| 30. | Discuss the different types of water. | | CO2 | U | 5 |
| 31. | Discuss the various factors that affects photosynthesis. | | CO4 | U | 5 |
| 32. | Explain the different types of mineral transporters. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Draw a neat labelled diagram of a plant cell. | CO1 | R | 6 |
|  | b. | Explain the function and deficiency symptoms of any three-mineral nutrient. | CO3 | U | 9 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the Proton-K+ pump theory of stomatal opening and closing. | CO2 | U | 10 |
|  | b. | Distinguish between transpiration and guttation. | CO3 | An | 5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the different biosynthetic pathway of auxin. | CO4 | U | 8 |
|  | b. | List any seven practical applications of PGR in agriculture and horticulture. | CO6 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the physiology of plant tissues and cells |
| CO2 | Remember water movement in plant systems like diffusion and osmosis |
| CO3 | Apply the concept of water relations, mineral uptake in the field of agriculture |
| CO4 | Summarize the various physiological processes |
| CO5 | Measure and analyze the physiological parameters of crops |
| CO6 | Practice the use of growth regulators correctly to solve physiological problems |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 5 |  |  |  |  | 15 |
| CO2 | 2 | 15 |  |  |  |  | 17 |
| CO3 | 5 | 14 | 5 | 10 |  |  | 34 |
| CO4 | 5 | 28 |  |  |  |  | 33 |
| CO5 | 1 | 5 |  |  |  |  | 6 |
| CO6 | 10 | 10 |  |  |  |  | 20 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG1002** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL HERITAGE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | List out the two CGIAR centers. | | CO1 | R | 1 |
| 2. | Identify the most extensive soil found in India. | | CO6 | R | 1 |
| 3. | Enlist the stages of stone age. | | CO1 | R | 1 |
| 4. | The father of green revolution is -------------. | | CO1 | R | 1 |
| 5. | The number of agro climatic zones in Tamil Nadu are ----------. | | CO1 | U | 1 |
| 6. | Name the district that comes under the high rainfall zone in Tamil Nadu. | | CO1 | R | 1 |
| 7. | Write the full form of ICAR. | | CO3 | R | 1 |
| 8. | The father of White revolution is ---------------. | | CO3 | R | 1 |
| 9. | Define agro-climatic zone. | | CO3 | R | 1 |
| 10. | Define heritage. | | CO3 | R | 1 |
| 11. | Write the full form of ITK. | | CO3 | R | 1 |
| 12. | A Continuous record of past events is called as ---------------. | | CO4 | R | 1 |
| 13. | A Inherited Value passed from one generation to other generation is called as \_\_\_\_\_\_\_\_\_. | | CO5 | U | 1 |
| 14. | Describe self – help groups. | | CO5 | U | 1 |
| 15. | Define farm mechanization. | | CO2 | R | 1 |
| 16. | Identify the abbreviation of ICRISAT and CRIDA. | | CO1 | R | 1 |
| 17. | Write the different kinds of fibre. | | CO1 | U | 1 |
| 18. | Define agricultural heritage. | | CO1 | U | 1 |
| 19. | Write the contribution of agriculture to the GDP in India. | | CO5 | U | 1 |
| 20. | List the tasks assigned for farm women. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss in brief agro climatic zones of Tamil Nadu. | | CO1 | An | 5 |
| 22. | Explain the impacts of green revolution in India. | | CO1 | U | 5 |
| 23. | Write the importance of agriculture. | | CO3 | R | 5 |
| 24. | Explain the strategies for rural women’s empowerment. | | CO2 | R | 5 |
| 25. | Write about importance of agricultural heritage. | | CO2 | An | 5 |
| 26. | Discuss about roles and importance of ITK. | | CO2 | U | 5 |
| 27. | Mention the relationship between main branches of agriculture. | | CO3 | An | 5 |
| 28. | Name any 5 national research institutions along with their headquarters. | | CO2 | U | 5 |
| 29. | Explain the current scenario of Indian agriculture. | | CO4 | An | 5 |
| 30. | Explain the multi-dimensional roles of women in Agriculture. | | CO5 | U | 5 |
| 31. | Explain the current scenario of Indian agriculture. | | CO4 | An | 5 |
| 32. | Write the scope and importance of agriculture in India. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the branches in agriculture. | CO2 | U | 8 |
|  | b. | Explain the strategies for rural women’s empowerment. | CO2 | R | 7 |
| 34. | a. | Write short notes on special category of crops. | CO3 | A | 8 |
|  | b. | Write in detail about soil classification. | CO6 | An | 7 |
| 35. | a. | Explain the women friendly agricultural technologies. | CO5 | An | 8 |
|  | b. | Elaborately discuss the relevance of heritage to present day agriculture. | CO1 | R | 7 |

CO – COURSE OUTCOME BL – BLOOMS’ LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand agricultural heritage of India, agricultural resources and development of Indian agriculture from ancient to modern era. |
| CO2 | Compare indigenous traditional knowledge in agriculture and crop voyage in India and the world. |
| CO3 | Describe gender perspective, tasks of farm women, women empowerment and self-help groups. |
| CO4 | Apply Indigenous Traditional Knowledge (ITK) in modern agricultural practices. |
| CO5 | Visualize transition of agriculture from past to present. |
| CO6 | Acquire knowledge on gender issues in agriculture for women empowerment and implement women-friendly agricultural technologies. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 12 | 8 | .. | 5 | .. | .. | 25 |
| CO2 | 18 | 18 | .. | 5 | .. | .. | 41 |
| CO3 | 10 | .. | 8 | 5 | .. | .. | 23 |
| CO4 | 1 | .. | .. | 10 | .. | .. | 11 |
| CO5 | 1 | 8 | .. | 8 | .. | .. | 17 |
| CO6 | 1 | .. | 7 | .. | .. | .. | 8 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG1008** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF GENETICS AND CYTOGENETICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Mention the name given to 'preformed miniature human' in preformation theory of heredity. | | CO1 | U | 1 |
| 2. | \_\_\_\_\_\_\_\_\_\_\_\_ proposed the ‘theory of Linkage’. | | CO1 | R | 1 |
| 3. | \_\_\_\_\_\_\_\_\_\_\_\_ determines the homozygosity and heterozygosity of an individual. | | CO1 | An | 1 |
| 4. | What is backcross? | | CO2 | A | 1 |
| 5. | The genetic linkage between two genes is measured in terms of \_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 6. | Write the name of chemical mutagen which is used to double the chromosome number in plants | | CO2 | U | 1 |
| 7. | Define ‘Epistasis’. | | CO3 | R | 1 |
| 8. | 2n -1 - 1 is called as \_\_\_\_\_\_\_\_\_\_\_ | | CO3 | U | 1 |
| 9. | Seedless fruits and vegetables are produced by induction of \_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | A | 1 |
| 10. | A small amount of lethal mutation is always present in the population due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | U | 1 |
| 11. | Give the name of mitochondrial genome-specific mutagen. | | CO4 | R | 1 |
| 12. | The cultivated wheat has \_\_\_\_\_\_\_ sets of chromosomes. | | CO4 | An | 1 |
| 13. | Write the complementary sequence for A A C T T G | | CO5 | A | 1 |
| 14. | The site of Protein synthesis in a eukaryotic cell is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 15. | List the non-sense or stop codons of amino acid synthesis. | | CO5 | U | 1 |
| 16. | Male sterility in plants is transmitted by \_\_\_\_\_\_\_ genes. | | CO6 | R | 1 |
| 17. | Leaf variegation in maize follows \_\_\_\_\_\_\_\_\_\_\_\_\_ inheritance. | | CO6 | U | 1 |
| 18. | \_\_\_\_\_\_\_\_ is the first male sterility based hybrid of pigeon pea. | | CO6 | An | 1 |
| 19. | Homeobox sequences are \_\_\_\_\_\_ bp long and regulates early stages of embryonic development. | | CO4 | R | 1 |
| 20. | Draw the shape of the curve produced by quantitative traits. | | CO3 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define Law of Independent Assortment with an example. | | CO1 | R | 5 |
| 22. | Differentiate Sex linked and sex limited traits with examples. | | CO3 | A | 5 |
| 23. | Who proposed Multiple factor hypothesis? Explain briefly. | | CO3 | U | 5 |
| 24. | Elucidate Equational division with neat sketches. | | CO2 | R | 5 |
| 25. | Explain the pre-mendelian theories of heredity. | | CO1 | U | 5 |
| 26. | Compare and contrast: Pericentric inversion and Paracentric inversion. | | CO4 | An | 5 |
| 27. | Explain Oligo and Poly genes with examples. | | CO6 | A | 5 |
| 28. | What are Okazaki fragments? List out the enzymes involved in DNA replication. | | CO5 | R | 5 |
| 29. | Elaborate ‘Transcription process’ in Prokaryotes. | | CO5 | U | 5 |
| 30. | Differentiate ‘Frame shift mutation and point mutation’. | | CO4 | A | 5 |
| 31. | Write elaborate notes on Multiple and pseudo alleles. | | CO6 | U | 5 |
| 32. | Explain the theory proposed by Sutton and Boveri on Inheritance. | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write short notes on Linkage Map and Linkage Disequilibrium. How to find out the strength of linkage? | CO2 | R | 8 |
|  | b. | Explain the Transcription and Translation processes of protein synthesis. | CO5 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the types of mutagens that causes chromosomal aberrations. | CO4 | A | 8 |
|  | b. | Write down the types and importance of numerical chromosomal aberration. | CO3 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Examine the extra-nuclear inheritance in plants. | CO6 | A | 8 |
|  | b. | How the expression of genes is regulated in prokaryotic cell? | CO1 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Solve problems in Mendelian genetics |
| CO2 | Construct gene map using linkage |
| CO3 | Identify the type of aberrations and its usage in agriculture |
| CO4 | Understand the process of inducing mutation by artificial methods |
| CO5 | Explain the central dogma of life |
| CO6 | Discuss Cytoplasmic inheritance in breeding |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 13 | - | 1 | - | - | 20 |
| CO2 | 14 | 1 | 6 | - | - | - | 21 |
| CO3 | 1 | 6 | 7 | 7 | - | - | 21 |
| CO4 | 2 | 1 | 13 | 6 | - | - | 22 |
| CO5 | 13 | 6 | 1 | - | - | - | 20 |
| CO6 | 1 | 6 | 13 | 1 | - | - | 21 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG1012** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRICULTURAL ECONOMICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Who has given wealth definition of economics? | | CO1 | R | 1 |
| 2. | What is called as macroeconomics? | | CO1 | R | 1 |
| 3. | What is the formula for calculating price elasticity of demand? | | CO1 | R | 1 |
| 4. | Which theory attempts to define what would be the economically ideal size of population for a particular country? | | CO6 | R | 1 |
| 5. | What is called as giffen good? | | CO2 | R | 1 |
| 6. | What is called as capital? | | CO3 | R | 1 |
| 7. | Define inflation. | | CO6 | R | 1 |
| 8. | What is called as time utility? | | CO2 | R | 1 |
| 9. | When price of a commodity increases, its quantity supplied will -------- | | CO2 | R | 1 |
| 10. | What is called as profit? | | CO3 | R | 1 |
| 11. | What is agricultural economics? | | CO4 | R | 1 |
| 12. | Car and petrol are competitive products. True/false | | CO3 | R | 1 |
| 13. | What is called as micro financing? | | CO4 | R | 1 |
| 14. | What is called as GNP? | | CO6 | R | 1 |
| 15. | Which stage in production function is called as rational stage? | | CO3 | R | 1 |
| 16. | Give one example for direct tax? | | CO5 | R | 1 |
| 17. | Define consumption. | | CO3 | R | 1 |
| 18. | When the family income increases, the percentage of income spent on food decreases, which economic law is behind this statement? | | CO3 | R | 1 |
| 19. | Which is the apex bank of our country? | | CO5 | R | 1 |
| 20. | What is called as oligopoly? | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Elaborate the importance of law of demand. | | CO2 | C | 5 |
| 22. | Explain canons of taxation. | | CO5 | U | 5 |
| 23. | Explain cardinal and ordinal measurement of utility. | | CO3 | U | 5 |
| 24. | Explain the different types of inflation. | | CO5 | U | 5 |
| 25. | List the characteristics of labour as a factor of production. | | CO3 | An | 5 |
| 26. | Explain the concept of consumer surplus. | | CO2 | U | 5 |
| 27. | Distinguish positive economics from normative economics. | | CO1 | An | 5 |
| 28. | Explain variable cost and fixed cost with graph. | | CO3 | U | 5 |
| 29. | Describe the characteristics of wants. | | CO2 | U | 5 |
| 30. | Explain the features of perfectly competitive and imperfect markets. | | CO3 | U | 5 |
| 31. | Explain wage fund theory. | | CO3 | U | 5 |
| 32. | Explain the characteristics of indifference curve. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the different types of elasticities. | CO2 | U | 7.5 |
|  | b. | Elaborate the important features of capitalistic, socialistic and mixed economy. | CO1 | C | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Elaborate the various concepts of national income accounting. | CO6 | C | 7.5 |
|  | b. | Explain Malthusian theory of population. | CO6 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the law of diminishing marginal utility with its assumptions, limitations and importance. | CO2 | U | 7.5 |
|  | b. | Explain circular flow of money in an economy. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the principle and theories, and its role in planning for economic development of the country |
| CO2 | Remember consumer behaviour - utility maximization problem and demand theory |
| CO3 | Explain fundamental concepts of agricultural economics, theory of production, theory of cost and output determination across market structures |
| CO4 | Evaluate different agricultural finance systems and their role as credit agencies |
| CO5 | Enumerate and discuss different taxes applicable to agriculture |
| CO6 | Analyse theory of general equilibrium and welfare economics |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | - | - | 5 | - | 7.5 | 15.5 |
| CO2 | 3 | 30 | - | - | - | 5 | 38 |
| CO3 | 7 | 27.5 | - | 5 | - | - | 39.5 |
| CO4 | 2 | - | - | - | - | - | 2 |
| CO5 | 2 | 10 | - | - | - | - | 12 |
| CO6 | 3 | 7.5 | - | - | - | 7.5 | 18 |
|  | 20 | 75 | 0 | 10 | 0 | 20 | **125** |



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| **Course Code** | **18AG1014** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is a leaflet in extension literature? | | CO1 | U | 1 |
| 2. | Write any three principles of Extension Education. | | CO1 | R | 1 |
| 3. | Who were the beneficiaries of the Nilokheri project? | | CO2 | An | 1 |
| 4. | List out the objectives of the Firka development scheme. | | CO1 | R | 1 |
| 5. | What is cyber-extension? | | CO1 | R | 1 |
| 6. | What is extension education? | | CO1 | U | 1 |
| 7. | What is meant by Rural Development? | | CO2 | R | 1 |
| 8. | What is meant by social media? | | CO3 | U | 1 |
| 9. | What is Credibility? | | CO3 | An | 1 |
| 10. | Define Innovation. | | CO2 | R | 1 |
| 11. | The word extension is derived from the Latin roots \_\_\_\_\_& \_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 12. | Brief the concept of the T&V system. | | CO2 | U | 1 |
| 13. | Define leadership. | | CO3 | U | 1 |
| 14. | \_\_\_\_\_\_\_\_\_\_\_is the process by which two or more people exchange ideas, facts, feelings or impressions in ways that each gains a common understanding of the meaning, intent and use of messages. | | CO2 | An | 1 |
| 15. | List out any two characteristics of an innovator. | | CO2 | An | 1 |
| 16. | Define Administration. | | CO3 | R | 1 |
| 17. | Expand ARYA. | | CO3 | R | 1 |
| 18. | Discuss the characteristics of a good communicator. | | CO2 | U | 1 |
| 19. | Explain diffusion process | | CO3 | U | 1 |
| 20. | Who are laggards? | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out the mandates of Krishi Vigyan Kendra | | CO4 | R | 5 |
| 22. | Explain the functions of POSDCORB. | | CO3 | R | 5 |
| 23. | Write about the Community Development Programme (CDP) in India. | | CO1 | U | 5 |
| 24. | Explain different types of leadership styles. | | CO2 | An | 5 |
| 25. | Differentiate Agricultural Journalism and Radio Journalism. | | CO2 | R | 5 |
| 26. | List out the objectives of SGRY. | | CO1 | R | 5 |
| 27. | Describe the stages of programme planning. | | CO3 | An | 5 |
| 28. | Write the classification of extension-teaching methods according to their use. | | CO2 | U | 5 |
| 29. | Explain adoption categories. | | CO3 | U | 5 |
| 30. | Differentiate result demonstration and method demonstration. | | CO3 | An | 5 |
| 31. | Describe any two individual contact methods in detail. | | CO1 | U | 5 |
| 32. | List out any FIVE pre-independence rural developments in India. | | CO1 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the Principles of Extension. | CO1 | U | 8 |
|  | b. | What is the scope of extension education? | CO1 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define communication. Describe the elements of communication. | CO2 | R | 8 |
|  | b. | Write a short note on any two   * Credibility * Treatment of message * Entropy | CO2 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the role of privatization in agriculture extension. | CO4 | U | 8 |
|  | b. | Write about the Extension reforms and structure of ATMA. | CO4 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Students learned the concepts of agricultural extension and rural development programs. |
| CO2 | New innovations in the area of agricultural extension in India understood |
| CO3 | Gained practical knowledge on watershed development and self-help groups |
| CO4 | New trends in agriculture extension learned |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 14 | 20 |  | 7 |  |  | 41 |
| CO2 | 15 | 7 |  | 15 |  |  | 37 |
| CO3 | 7 | 9 |  | 11 |  |  | 27 |
| CO4 | 5 | 15 |  |  |  |  | 20 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2001** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF PLANT BREEDING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define heterosis. Who coined the term? | | CO3 | R | 1 |
| 2. | Inbreeding depression is higher in ------------------ pollinated crops and lower in ----------------- pollinated crops. | | CO1 | R | 1 |
| 3. | What is the phenotypic ratio of a dihybrid cross? | | CO1 | U | 1 |
| 4. | What is an iso-genic line? Give examples. | | CO3 | U | 1 |
| 5. | What are the sources of dwarfing genes in rice and wheat? | | CO2 | R | 1 |
| 6. | The concept of the development of multiline was given by -------------------- | | CO3 | R | 1 |
| 7. | \_\_\_\_\_\_\_\_\_\_\_ act in 2001 was given to protect the farmers and plant breeders  to encourage the cultivation of new varieties of plants | | CO6 | R | 1 |
| 8. | What are chemical hybridizing agents? Give examples. | | CO3 | U | 1 |
| 9. | The ratio of genotypic variance to the phenotypic variance is called ------------ | | CO1 | R | 1 |
| 10. | What is micro-center? Who gave the concept? | | CO2 | U | 1 |
| 11. | Define landraces. Give examples of landraces in any crop species. | | CO2 | A | 1 |
| 12. | What is progent test? Who gave the concept? | | CO1 | A | 1 |
| 13. | The progeny of a self-pollinated homozygous plant obtained by selfing is called ------------------- | | CO1 | A | 1 |
| 14. | F1 is a heterozygous individual and homogenous population (True or False) | | CO1 | A | 1 |
| 15. | The center of origin for maize is ----------------------- | | CO1 | R | 1 |
| 16. | The process of bringing a wild species under human management is referred to as -------------------- | | CO1 | A | 1 |
| 17. | What are farmer’s rights? | | CO6 | R | 1 |
| 18. | What is often cross-pollination? Give examples of often cross-pollinated crops | | CO1 | R | 1 |
| 19. | What is man-made cereal? | | CO2 | A | 1 |
| 20. | List out the mechanism of drought stress. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain cytoplasmic genic male sterility with a suitable example. | | CO3 | U | 5 |
| 22. | What is heritability? Explain its types. | | CO1 | An | 5 |
| 23. | Differentiate synthetics and composites. | | CO3 | An | 5 |
| 24. | What is marker-assisted selection (MAS)? Explain the advantages of MAS . | | CO4 | U | 5 |
| 25. | Explain the method of clonal selection with an example. | | CO3 | U | 5 |
| 26. | Write a brief note on the pedigree method of breeding. | | CO3 | U | 5 |
| 27. | Explain the significant achievements in plant breeding. | | CO1 | A | 5 |
| 28. | What are Intellectual Property Rights (IPR)? Explain with suitable examples. | | CO5 | U | 5 |
| 29. | Explain the significance of apomixis in plant breeding. | | CO1 | A | 5 |
| 30. | Differentiate between qualitative and quantitative traits. | | CO2 | A | 5 |
| 31. | Briefly explain the historical milestones in plant breeding. | | CO1 | U | 5 |
| 32. | Explain the procedure for plant introduction. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define centers of origin or diversity. Who proposed the concept? List out the centers with suitable examples. | CO1 | A | 8 |
|  | b. | Explain the genetic basis of heterosis and types of heterosis with the formula. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the evaluation methods of inbred for the development of hybrid varieties. | CO3 | U | 8 |
|  | b. | What is transgenic male sterility? Explain with a suitable example. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Differentiate pedigree method and backcross method of breeding. | CO3 | An | 8 |
|  | b. | Explain different types of molecular markers used in crop improvement. | CO4 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the basic concepts of plant breeding and genetics |
| CO2 | Remember origin and diversity of different crops, components of inheritance and variations |
| CO3 | Apply the knowledge to develop high-yielding crops with improved quality |
| CO4 | Produce varieties and hybrids with host plant resistance |
| CO5 | Apply the protocols of Intellectual Property Rights and Patenting in the release of new  variety/hybrid |
| CO6 | Analyze Plant Breeders and Farmer’s Rights for research and commercial seed production of  high yielding crops |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 6 | 22 | 5 | - | - | 37 |
| CO2 | 1 | 8 | 7 | - | - | - | 16 |
| CO3 | 2 | 37 | - | 13 | - | - | 52 |
| CO4 | - | 13 | - | - | - | - | 13 |
| CO5 | - | 5 | - | - | - | - | 5 |
| CO6 | 2 | - | - | - | - | - | 2 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2002** | **Duration** | **3hrs** |
| **Course Name** | **CROP PRODUCTION TECHNLOGY – I (KHARIF CROPS)** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define kharif season. | | CO1 | U | 1 |
| 2. | ------- is the origin for black gram crop. | | CO1 | R | 1 |
| 3. | The protein percentage of soy bean is about ------- %. | | CO2 | U | 1 |
| 4. | The -------- and -------- bio fertilizers are recommending for rice crop production. | | CO3 | U | 1 |
| 5. | Define pulse crop with examples. | | CO3 | U | 1 |
| 6. | The ----------- pre emergence herbicide is recommended for finger millet crop. | | CO6 | A | 1 |
| 7. | The seed rate for short duration rice is about ------- kg / ha. | | CO4 | A | 1 |
| 8. | Define fodder crops. | | CO2 | U | 1 |
| 9. | ------ crops consider as queen of cereals. | | CO1 | R | 1 |
| 10. | The acid delinting is recommending for -------- crop. | | CO5 | R | 1 |
| 11. | List out the important oil seed crops in Tamil Nadu with their botanical name. | | CO2 | U | 1 |
| 12. | ------- crops consider as king of fiber. | | CO1 | R | 1 |
| 13. | The 2, 4 D is classified as -------- type of herbicide. | | CO2 | R | 1 |
| 14. | List out the importance of rice fallow black gram. | | CO1 | U | 1 |
| 15. | ICAR - Indian Institute of Pulses Research is located at ---------. | | CO3 | A | 1 |
| 16. | *cajanus cajan* is commonly called as --------. | | CO1 | R | 1 |
| 17. | Jute crop production is higher in ------ state in India. | | CO2 | U | 1 |
| 18. | Define nutri-cereals. | | CO1 | R | 1 |
| 19. | Define baby corn. | | CO4 | U | 1 |
| 20. | ------- crop is highly suitable for silage making. | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain abut rice seasons in Tamil Nadu. | | CO4 | U | 5 |
| 22. | List out the important characters for difference maize available for cultivation. | | CO3 | U | 5 |
| 23. | Explain about important inter cultivation operations for ground nut cultivation. | | CO2 | A | 5 |
| 24. | Write about soil and climatic requirements for black gram crop. | | CO2 | A | 5 |
| 25. | Explain about jute processing. | | CO1 | U | 5 |
| 26. | Elaborate the types of cotton available for cultivation. | | CO3 | U | 5 |
| 27. | Differentiate between sorghum effect and sorghum injury. | | CO4 | A | 5 |
| 28. | Give the information about botanical name, common name and origin of minor millet crops. | | CO2 | A | 5 |
| 29. | Differentiate between *C. capsularis and C. Olitoius*. | | CO5 | U | 5 |
| 30. | Write about season and important varieties for red gram cultivation in Tamil Nadu. | | CO3 | A | 5 |
| 31. | Explain about nursery preparation for finger millet crop. | | CO5 | U | 5 |
| 32. | Explain about weed management practices for cumbu crop. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about different types of rice nursery followed in Tamil Nadu. | CO1 | U | 8 |
|  | b. | Write about agronomic requirements for pearl millet crop production. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain about multi bloom technique and foliar feeding approach in green gram crop cultivation. | CO4 | U | 8 |
|  | b. | Explain about seed treatment techniques in cotton crop with their advantages. | CO4 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain about sesame cultivation practices in Tamil Nadu. | CO6 | A | 8 |
|  | b. | Write a brief note on fodder sorghum production technologies. | CO5 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the crop production technology for kharif crops |
| CO2 | Explain the geographical distribution of kharif crops |
| CO3 | Recall crop production requirements for kharif season crops |
| CO4 | Remember soil and climatic requirements of different kharif crop varieties |
| CO5 | Describe crop management practices for kharif season |
| CO6 | Apply the acquired knowledge to guide the farmers for cultivating kharif crops |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 15 | - | - | - | - | 20 |
| CO2 | 1 | 12 | 15 | - | - | - | 28 |
| CO3 | - | 17 | 6 | - | - | - | 23 |
| CO4 | - | 14 | 13 | - | - | - | 27 |
| CO5 | 1 | 10 | 7 | - | - | - | 18 |
| CO6 | - | - | 9 | - | - | - | 9 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2003** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL FINANCE AND COOPERATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Which study addresses borrowing and lending practices among farmers and organizations? | | CO1 | U | 1 |
| 2. | Which credit is granted for the purchase of inputs? | | CO1 | R | 1 |
| 3. | What is the medium-term credit repayment period? | | CO1 | R | 1 |
| 4. | What kind of credit is granted to farmers while maintaining warehouse receipt as security? | | CO1 | R | 1 |
| 5. | List out the 3R’s of agricultural credit. | | CO1 | R | 1 |
| 6. | Write down the benefit-cost ratio formula. | | CO5 | R | 1 |
| 7. | What is the formula used to calculate payback period? | | CO5 | R | 1 |
| 8. | What are the two financial funding sources available to farmers? | | CO1 | U | 1 |
| 9. | How many banks were nationalised in the first phase, and when did they happen? | | CO2 | R | 1 |
| 10. | Abbreviate the term DICGC. | | CO3 | R | 1 |
| 11. | Who chaired the working committee that suggested setting up Regional Rural Banks? | | CO3 | R | 1 |
| 12. | Which year the All-India Rural Credit Review Committee was established, and who served as its chairman? | | CO3 | R | 1 |
| 13. | Expand IRR. | | CO5 | R | 1 |
| 14. | Which co-operative society was founded in 1957 specifically to serve farmers' credit and non-credit needs? | | CO6 | R | 1 |
| 15. | When was NABARD Bank founded? | | CO3 | R | 1 |
| 16. | Expand NAFED. | | CO6 | R | 1 |
| 17. | Which is the apex organization of the Indian banking industry? | | CO3 | R | 1 |
| 18. | List the two channels through which microfinance operates in India. | | CO2 | R | 1 |
| 19. | Who introduced Kisan Credit card in India? | | CO2 | R | 1 |
| 20. | What is the other name of Profit and loss statement? | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain 5’Cs of farm finance. | | CO1 | U | 5 |
| 22. | Explain the functions of National Bank of Agricultural and Rural Development (NABARD). | | CO3 | U | 5 |
| 23. | Discuss the lead bank scheme. | | CO2 | U | 5 |
| 24. | Differentiate financing agriculture sector and other sector. | | CO1 | U | 5 |
| 25. | List out the purposes of World Bank. | | CO3 | U | 5 |
| 26. | Explain the components of balance sheet. | | CO5 | R | 5 |
| 27. | Summarize the activities of National Agricultural Cooperative Marketing Federation of India. | | CO6 | U | 5 |
| 28. | Difference between scheduled and Non-scheduled banks in India. | | CO1 | AN | 5 |
| 29. | Discuss the types of discounted measures. | | CO5 | U | 5 |
| 30. | Describe the roles that a multipurpose cooperative society plays. | | CO6 | U | 5 |
| 31. | How does the National Cooperative Development Corporation (NCDC) function? | | CO6 | U | 5 |
| 32. | Describe the benefits of SWOT analysis and how strategic planning is made easier by it. | | CO5 | AN | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain how the seven "Ps" can be applied to achieve the benefit of society. | CO1 | U | 8 |
|  | b. | Briefly describe the pre-independence history of the cooperative movement. | CO6 | U | 7 |
| 34. | a. | Describe the Millennium Development Goals in terms of the World Bank. | CO3 | AN | 8 |
|  | b. | Elaborate the principles of cooperation. | CO6 | R | 7 |
| 35. | a. | How balance sheet is compiled for analyzing the financial performance of the farm. | CO4 | U | 8 |
|  | b. | Explain various components of income statement. | CO4 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the financial system in India |
| CO2 | Apply principles of banking and credit appraisal procedure |
| CO3 | Analyze credit and deposit services of private, public and cooperative sector banks. |
| CO4 | Prepare and analyze balance sheet and income and expenditure statements of a business unit |
| CO5 | Develop skills in credit analysis, dealing with bankers, loan application procedures. |
| CO6 | Popularize farmer-friendly schemes of Crop insurance and Cooperative warehousing among farmers. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 25 | - | 5 | - | - | 24 |
| CO2 | 3 | 5 | - | - | - | - | 8 |
| CO3 | 5 | 10 | - | 8 | - | - | 23 |
| CO4 | 7 | 8 | - | - | - | - | 15 |
| CO5 | 9 | 5 | - | -- | - | - | 14 |
| CO6 | 9 | 22 | - |  | - | - | 31 |
|  | | | | | | | **125** |



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| **Course Code** | |  | | --- | | **18AG2005** | | **Duration** | **3hrs** |
| **Course Name** | |  | | --- | | **LIVESTOCK AND POULTRY MANAGEMENT** | | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The tallest sheep breed in India is ---------. | | CO2 | A | 1 |
| 2. | --------- is the act of cutting the wool of sheep. | | CO1 | C | 1 |
| 3. | A cow or buffalo that has not yet given birth to a calf is called a ---------. | | CO4 | An | 1 |
| 4. | The removal of horn buds in calves less than 8 weeks of age is known as --- | | CO3 | R | 1 |
| 5. | Another name for Infectious Bursal Disease (IBD) is --------- . | | CO6 | U | 1 |
| 6. | In a hatchery, eggs are set with the broad end up in setter for --------- days. | | CO4 | R | 1 |
| 7. | Mastitis is the inflammation of ---------. | | CO6 | C | 1 |
| 8. | Light intensity can be measured by using a --------- . | | CO5 | R | 1 |
| 9. | The breed of buffalo with a tightly curved horn is --------- . | | CO2 | U | 1 |
| 10. | -------- is a device used for providing artificial heat to chicks. | | CO5 | C | 1 |
| 11. | An uncastrated adult male pig kept for breeding purpose is called --------- . | | CO3 | A | 1 |
| 12. | The incubation period of chicken egg is --------- . | | CO3 | E | 1 |
| 13. | The act of parturition in cattle is called --------- . | | CO2 | A | 1 |
| 14. | Meat from goat is called --------- . | | CO3 | U | 1 |
| 15. | An exotic breed of sheep that produces Pelt is --------- . | | CO3 | R | 1 |
| 16. | Peste des Petits Ruminants (PPR) is a viral disease affecting --------- . | | CO6 | U | 1 |
| 17. | In a hatchery, chicks are vaccinated against --------- before delivery. | | CO6 | E | 1 |
| 18. | Weaning should preferably be done at --------- days in sheep and goats. | | CO2 | R | 1 |
| 19. | Other name for free range system of poultry rearing is ---------. | | CO1 | U | 1 |
| 20. | The gestation period of goat is --------- days. | | CO2 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | What is flushing in sheep production? | | CO2 | C | 5 |
| 22. | Name five indigenous cattle breeds of Tamil Nadu. | | CO4 | An | 5 |
| 23. | Explain the different types of chicken brooders. | | CO4 | R | 5 |
| 24. | What is candling of eggs? | | CO3 | An | 5 |
| 25. | What are the different types of registers kept in a livestock farm? | | CO3 | R | 5 |
| 26. | What is deworming in animal husbandry? | | CO6 | A | 5 |
| 27. | What are the steps in clean milk production? | | CO6 | R | 5 |
| 28. | What are the housing requirements for goat? | | CO5 | An | 5 |
| 29. | What are the common biosecurity measures in a poultry farm? | | CO5 | U | 5 |
| 30. | What are the 5 different methods of identification of livestock? | | CO3 | R | 5 |
| 31. | Describe the breed characteristics of White Leghorn chicken? | | CO2 | E | 5 |
| 32. | What are the differences between natural incubation and artificial incubation in poultry? | | CO5 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the classification of poultry breeds based on utility.(7.5 Mark) | CO2 | R |  |
|  | b. | Differentiate between deep litter system and cage system of poultry rearing. (7.5 Mark) | CO6 | R |
|  |  |  |  |  |  |
| 34. | a. | Describe any 5 exotic breeds of pigs and their characteristics. (7.5 Mark) | CO2 | C |  |
|  | b. | Explain the importance of feeding colostrum to calves. (7.5 Mark) | CO3 | C |
|  |  |  |  |  |  |
| 35. | a. | Explain the cause, types, symptoms, diagnosis and prevention of Ranikhet disease (7.5 Mark) | CO6 | E |  |
|  | b. | What are the management practices to reduce heat stress in cows and buffaloes? (7.5 Mark) | CO3 | U |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Know the importance of farm animals and its influence in rural economy |
| CO2 | Distinguish the characteristics of indigenous and exotic breeds of cattle, goat, sheep, pig and poultry |
| CO3 | Select quality breeds of livestock and poultry |
| CO4 | Choose nutritious feed rations for livestock and poultry |
| CO5 | Set up proper housing for farm animals and poultry |
| CO6 | Management of the common diseases of farm animals and birds |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 1 |  |  |  | 1 | 2 |
| CO2 | 8.5 | 1 | 2 | 1 | 5 | 12.5 | 30 |
| CO3 | 12 | 8.5 | 1 | 5 | 1 | 7.5 | 35 |
| CO4 | 6 |  |  | 6 |  |  | 12 |
| CO5 | 1 | 5 | 5 | 5 |  | 1 | 17 |
| CO6 | 12.5 | 2 | 5 |  | 8.5 | 1 | 29 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2006** | **Duration** | **3hrs** |
| **Course Name** | **AGRI INFORMATICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is an inference engine? | | CO6 | U | 1 |
| 2. | Crop \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an indication of crop yield. | | CO3 | R | 1 |
| 3. | Name the scientist who initiated the children education project called as ‘Hole in the wall’. | | CO1 | R | 1 |
| 4. | Given an example for a smart phone application used for marketing farm produces. | | CO4 | A | 1 |
| 5. | What is the toll-free number of Kisan Call Centre? | | CO1 | R | 1 |
| 6. | What is UPI? | | CO1 | R | 1 |
| 7. | Segments or arcs in spatial data representation refers to point data (State True/False). | | CO2 | An | 1 |
| 8. | Web maps are employed for the purpose of (complete the sentence with the correct answer from the given options)   1. data dissemination b) data analytics 2. data acquisition d) display information | | CO2 | An | 1 |
| 9. | Android applications are written using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ languages | | CO4 | R | 1 |
| 10. | What is a connected cow? | | CO5 | U | 1 |
| 11. | Most of the Agri-Expert system are based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO6 | U | 1 |
| 12. | The tool to analyze and model data into information useful in making quality decisions   1. DSS b) GIS c) CROPWAT d) CLIMGEN | | CO5 | U | 1 |
| 13. | Non-spatial data is also called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 14. | Information Village Project was an ICT initiative of which non-profit organization. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 15. | Most of the Agri-Expert system are based on Rules and Knowledge representation in any expert system is in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | U | 1 |
| 16. | SMS Portal was inaugurated by the Hon’ble President of India on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 17. | IVRS stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 18. | Android is owned by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | R | 1 |
| 19. | Name an e-Governance initiative for the rural sector which provides comprehensive software solution attempting automation of Gram Panchayat functions. | | CO1 | R | 1 |
| 20. | Name the ICT initiative of ITC Limited in India with rural farmers *via* internet for procurement of agricultural products. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write a note on Warana “Wired Village” project. | | CO1 | U | 5 |
| 22. | Write a detailed account on evapotranspiration and the different methods used for estimating ET? | | CO3 | U | 5 |
| 23. | Give the salient features of RML Market Light. | | CO1 | R | 5 |
| 24. | Explain thermal signatures with an example. | | CO2 | U | 5 |
| 25. | Give any five advantages of an Expert System in agriculture. | | CO6 | A | 5 |
| 26. | What are big data analytics? Evaluate the critical differences between chaining and backward chaining in expert systems. | | CO6 | E | 5 |
| 27. | What are the applications of remote sensing in mapping soil fertility? | | CO2 | A | 5 |
| 28. | What are computer models? Mention different types of plant architecture models with suitable examples. | | CO3 | U | 5 |
| 29. | Explain the significance of KISAN SUVIDHA Mobile app. | | CO1 | R | 5 |
| 30. | Define Variable rate technology. Explain the types of VRT and its advantages. | | CO5 | U | 5 |
| 31. | Give a brief note on the importance of controlled traffic farming. | | CO5 | A | 5 |
| 32. | What is the significance of L- modelling? | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the role of ICT tools in water management. How does it enable farmers for enhancing water use efficiency? | CO5 | A | 8 |
|  | b. | Write an account on any four ICT initiatives launched in India for the welfare of farmers with respect to its benefits. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Write any one android-based mobile application for each of the following and explain their salient features:   1. Early diagnosis of disease 2. Crop insurance 3. Marketing | CO4 | A | 8 |
|  | b. | Explain the role of geospatial technology in precision farming. | CO2 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | What is Kisan Call Centre? Explain its functions with a schematic representation. | CO1 | R | 8 |
|  | b. | What is a decision support system? Give the classification of DSS according to relationship and write the taxonomies according to Daniel Power | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand use of information, communication and technology (ICT) in agriculture |
| CO2 | Use GIS and GPS systems in precision agriculture |
| CO3 | Develop computerized models to understand plant growth process. |
| CO4 | Use smart phone devices in farm advisory, farm price and postharvest management |
| CO5 | Manage input requirements for crops and animals |
| CO6 | Use Agriculture Expert system and Soil Information Systems for farm decisions |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 25.5 | 12.5 | - | - | - | - | 38.0 |
| CO2 | 1 | 5 | 12.5 | 2 | - | - | 20.5 |
| CO3 | 1 | 15 | - | - | - | - | 16.0 |
| CO4 | 2 | - | 8.5 | - | - | - | 10.5 |
| CO5 | - | 14.5 | 12.5 | - | - | - | 27.0 |
| CO6 | - | 3 | 5 | - | 5 | - | 13.0 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **18AG2007** | **Duration** | **3hrs** |
| **Course Name** | **FARMING SYSTEMS AND SUSTAINABLE AGRICULTURE** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Expand LEISA and HEIA. | | CO6 | C | 1 |
| 2. | The slash-and-burn type of shifting cultivation in the hill tracts of Bangaladesh and Assam is called ---------------. | | CO1 | R | 1 |
| 3. | The cultivation of crop regrowth after harvest, although not necessarily for grain is called -------------- cropping. | | CO2 | U | 1 |
| 4. | Define minimum tillage. | | CO2 | C | 1 |
| 5. | Sorghum effect. | | CO3 | A | 1 |
| 6. | Define Irrigation requirement with formula. | | CO1 | A | 1 |
| 7. | Define LER with appropriate formula. | | CO5 | R | 1 |
| 8. | Use of land for the concurrent production of agricultural and forest crops is known as -----------------. | | CO2 | U | 1 |
| 9. | Define conservation Agriculture. | | CO3 | A | 1 |
| 10. | The yearly sequence and spatial arrangement of crops or crops and fallow on a given area-----------------. | | CO1 | U | 1 |
| 11. | Complementary use of environmental resources by intercrop components is called ---------------. | | CO1 | U | 1 |
| 12. | Sowing crops without any preparatory cultivation --------------- tillage. | | CO3 | R | 1 |
| 13. | Broad Bed Furrow system (BBF) is a classic example of --------------- method of land shaping. | | CO3 | U | 1 |
| 14. | In cereal-legume intercropping, the legume component is capable of fixing atmospheric ---------------. | | CO2 | E | 1 |
| 15. | Formula for calculating of Crop Equivalent Yield (CEY) ---------------. | | CO6 | E | 1 |
| 16. | The cultivation of crop regrowth after harvest is called as-------------. | | CO1 | R | 1 |
| 17. | Define Relay cropping with example. | | CO2 | R | 1 |
| 18. | A branch of science which deals with the study of grasses, their classification management and utilization is know as --------------. | | CO2 | U | 1 |
| 19. | -------------- mushroom cultivation is widely practiced under IFS. | | CO5 | R | 1 |
| 20. | Growing of only one crop on a piece of land year after year is known as ------ | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define with example (i) Mono cropping (ii) Multiple cropping (iii) ley farming (iv) Relay cropping (v) Paira cropping. | | CO2 | U | 5 |
| 22. | Write the measures to reduce main field duration. | | CO3 | A | 5 |
| 23. | Define Integrated Farming System. What are the benefits of Integrated Farming System? | | CO5 | R | 5 |
| 24. | Define Annidation with its types. Give appropriate examples. | | CO1 | U | 5 |
| 25. | Allelopathy and its types - Explain with example. | | CO1 | U | 5 |
| 26. | Define LEISA. Differentiate LEISA and HEIA. | | CO3 | A | 5 |
| 27. | List out the non-monetary inputs in farming system. | | CO2 | R | 5 |
| 28. | Criteria for selection of crops for intercropping. | | CO2 | An | 5 |
| 29. | What are the Plant Protection Measures in cropping systems management? | | CO3 | U | 5 |
| 30. | List out the possible enterprises that can be combined in wetland, garden land and dryland eco systems of IFS. | | CO4 | E | 5 |
| 31. | Prepare a IFS plan for 1 acre of wetland with paddy + Poultry + Fish + Mushroom + resource recycling. | | CO5 | An | 5 |
| 32. | Explain about the importance of cropping system approach. | | CO1 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain in detail about the measures to reduce the main field duration. | CO6 | E | 7.5 |
|  | b. | Write the factors affecting water requirement in cropping system. | CO3 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the scope and advantages of IFS. | CO5 | An | 7.5 |
|  | b. | Explain resource recycling in wetland with a neat diagram. | CO6 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Define intercropping. List out different intercropping systems with examples. | CO2 | R | 7.5 |
|  | b. | Explain the factors affecting water requirement in farming system. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the different cropping and farming systems |
| CO2 | Differentiate the different types of farming and cropping systems |
| CO3 | Relate between sustainable agriculture and conventional agriculture |
| CO4 | Understand different concept and components of integrated farming systems management |
| CO5 | Understand the indicators in cropping, farming and integrated farming system |
| CO6 | Evaluation of cropping, farming and integrated farming system |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 12 | 1 | - | - | 5 | 21 |
| CO2 | 13.5 | 8 | - | 5 | 1 | 1 | 28.5 |
| CO3 | 1 | 13.5 | 19.5 | - | - | - | 34 |
| CO4 | - | - | - | - | 5 | 1 | 5 |
| CO5 | 7 | - | - | 2.5 | - | - | 19.5 |
| CO6 | - | - | - | 7.5 | 8.5 | 1 | 17 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2008** | **Duration** | **3hrs** |
| **Course Name** | **CROP PRODUCTION TECHNOLOGY – 1I (RABI CROPS)** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The first semi dwarf spring wheat developed in the world is ------------------ . | | CO1 | R | 1 |
| 2. | The dwarf wheat which contributed to the development of high yielding semi dwarf wheat varieties is --------------------- . | | CO1 | R | 1 |
| 3. | Most important critical growth stage for irrigation of wheat is ----------------. | | CO2 | U | 1 |
| 4. | The nitrogen bio-fertililizer used for seed treatment in sunflower is ------------. | | CO4 | U | 1 |
| 5. | Raya, Laha, Rai are local names of ---------------------- crop. | | CO2 | R | 1 |
| 6. | Lentil is grown in India during ------------- season. | | CO4 | U | 1 |
| 7. | Among rapeseed and mustard, the species cultivated in 75-80 % area in India is ---------------------- . | | CO4 | U | 1 |
| 8. | Botanical name of Brown or Indian mustard is --------------------------. | | CO4 | An | 1 |
| 9. | Oil of rapeseed and mustard contains 41 to 57 % ------------ acid and hence not permitted for direct use in many countries. | | CO4 | A | 1 |
| 10. | Among the edible vegetable oils imported into India, ------------- oil is imported in the largest quantity. | | CO2 | A | 1 |
| 11. | Keeping bee hives at the rate of ------- numbers / ha improves seed setting in sunflower. | | CO4 | C | 1 |
| 12. | ----------------- and ---------------- are two places in India where sugarcane flowers and set seeds. | | CO5 | An | 1 |
| 13. | Among the Indian states ---------------- has the highest productivity of sugarcane. | | CO5 | An | 1 |
| 14. | ------------------ number of buds are to be planted in one meter length when sugarcane setts are planted end to end in furrows. | | CO5 | An | 1 |
| 15. | The recommended spacing for planting single budded chip seedlings of sugarcane under SSI method is ------ x --------- feet. | | CO5 | R | 1 |
| 16. | Degree ------------- values of 18 to 20 degree indicates the optimum maturity of sugarcane for harvest. | | CO5 | R | 1 |
| 17. | Lemon grass originated in --------------------- country. | | CO5 | R | 1 |
| 18. | --------------------- mint is cultivated in larger areas in India. | | CO5 | R | 1 |
| 19. | Vegetative matter, fresh or preserved, utilized as feed for animals is known as ----------------------------- . | | CO2 | U | 1 |
| 20. | King of fodder crops is ---------------------------- . | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Distinguish between winter wheat and spring wheat. | | CO1 | An | 5 |
| 22. | Explain in detail about the differences and uses of two and six row barleys. | | CO3 | A | 5 |
| 23. | Distinguish between desi and kabuli types of bengal gram. | | CO4 | R | 5 |
| 24. | Explain the seed rate, seed treatment, spacing, water management and weed management in pulses cultivation. | | CO2 | U | 5 |
| 25. | Economic Importance of barley crop | | CO3 | An | 5 |
| 26. | Write a short note on economic importance of rapeseed and mustard in India. | | CO4 | E | 5 |
| 27. | Explain the various methods to improve seed set in sunflower. | | CO4 | A | 5 |
| 28. | Explain the various steps of chip bud nursery preparation of sugarcane. | | CO5 | C | 5 |
| 29. | Explain the various methods of planting sugarcane. | | CO5 | E | 5 |
| 30. | Write a short note on importance of Bengal gram. | | CO6 | E | 5 |
| 31. | Explain the economic importance of Barley. | | CO4 | U | 5 |
| 32. | List out the major fodder crops cultivated during rabi season in India and explain the importance of fodder crops in Indian agriculture. | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Give a brief account of various harvesting and processing methods of wheat in India. | CO3 | An | 8 |
|  | b. | What are the different value added products of wheat in India and mention the harmful effect of continuous use of maida products. | CO3 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the annual requirement, production and import of edible vegetable oil in India. Write the botanical name and importance of sunflower in India. | CO4 | A | 8 |
|  | b. | Why Pulses production and productivity is less in India ? Enumerate with possible solution. | CO6 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Define ratooning. Explain the management practices for ratoon sugarcane. | CO5 | R | 8 |
|  | b. | Write a short note on sugarcane by products derived from sugar industry and their uses. | CO1 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the economic importance of Rabi crops |
| CO2 | Know the agro-ecological requirements for Rabi crop production |
| CO3 | Apply cultural practices and post harvest technology for Wheat and Barley |
| CO4 | Apply cultural practices and post harvest technology for oilseeds and pulses |
| CO5 | Apply cultural practices and post harvest technology of sugarcane and medicinal crops |
| CO6 | Be aware of the innovations and research advancements in Rabi crop production |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 |  |  | 5 |  | 7 | 14 |
| CO2 | 2 | 7 | 1 |  |  |  | 10 |
| CO3 |  |  | 5 | 13 | 7 |  | 25 |
| CO4 | 5 | 8 | 14 | 1 | 5 | 1 | 34 |
| CO5 | 12 |  |  | 3 | 5 | 5 | 25 |
| CO6 |  |  |  | 12 | 5 |  | 17 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2010** | **Duration** | **3hrs** |
| **Course Name** | **PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the family of banana and apple. | | CO3 | R | 1 |
| 2. | List any two beverage crops. | | CO1 | R | 1 |
| 3. | Name the important institutes working on fruits and plantation crops. | | CO1 | R | 1 |
| 4. | Define grafting in fruit crops. | | CO2 | R | 1 |
| 5. | Name the types of coconut based on growth habit. | | CO3 | R | 1 |
| 6. | Write the fruit type of mango. | | CO3 | C | 1 |
| 7. | Define propping in banana. | | CO3 | R | 1 |
| 8. | Name one important rootstocks of sapota. | | CO2 | R | 1 |
| 9. | List two types of suckers in banana. | | CO3 | R | 1 |
| 10. | Define mango malformation. | | CO6 | R | 1 |
| 11. | Expand CPCRI. | | CO1 | U | 1 |
| 12. | Recall the scientific name of areca nut and coconut. | | CO3 | R | 1 |
| 13. | List any two fruits rich in Vitamin C. | | CO1 | R | 1 |
| 14. | Name any two value added products of mango and banana. | | CO3 | R | 1 |
| 15. | Memorize the standard spacing for banana and mango. | | CO3 | R | 1 |
| 16. | Bhagwa is a variety of \_\_\_\_\_\_\_\_\_\_\_ fruit crop. | | CO3 | R | 1 |
| 17. | Name any two important physiological disorders in mango. | | CO6 | R | 1 |
| 18. | Name the fermented products prepared from cashew and apple. | | CO2 | R | 1 |
| 19. | Write the commercial propagation method in guava. | | CO2 | C | 1 |
| 20. | Define pomology. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate tall and dwarf coconut with examples. | | CO3 | U | 5 |
| 22. | Differentiate climacteric and non-climacteric fruits with examples. | | CO3 | U | 5 |
| 23. | Enumerate the steps involved in paring and pralinage in banana. | | CO2 | R | 5 |
| 24. | Write in detail about bahar treatment followed in pomegranate. | | CO3 | C | 5 |
| 25. | Write the important horticultural problems in mango. | | CO2 | C | 5 |
| 26. | Write the important processed products prepared out of coconut. | | CO3 | C | 5 |
| 27. | Name the important grades of tea, coffee and rubber. | | CO3 | R | 5 |
| 28. | Write in detail about the different species of citrus with their botanical name and characters. | | CO3 | C | 5 |
| 29. | List the important varieties of papaya. | | CO3 | R | 5 |
| 30. | Write about the shade management in coffee. | | CO3 | C | 5 |
| 31. | Write scientific name of any five fruit crops with one health benefit. | | CO3 | C | 5 |
| 32. | List the important varieties of mango and grapes. | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write in detail about the tapping in rubber. | CO3 | C | 7.5 |
|  | b. | Describe the processing and grades of areca nut. | CO3 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write the scope and importance of fruits and plantation crops. | CO1 | C | 7.5 |
|  | b. | Write the flow chart for processing of tea. | CO3 | C | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the intercultural operations followed in banana. | CO3 | C | 7.5 |
|  | b. | Describe the propagation methods followed in mango, guava, and citrus. | CO2 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the scope and importance of fruit and plantation crop production |
| CO2 | Apply propagation methods in fruit and plantation crops |
| CO3 | Apply production technologies in fruit and plantation crops |
| CO4 | Manage pests of fruit and plantation crops |
| CO5 | Control diseases of fruits and plantation crops |
| CO6 | Handle physiological disorders of fruit and plantation crops |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | **4** | 1 | - | - | - | 7.5 | 12.5 |
| CO2 | **15.5** | - | - | - | - | 6 | 21.5 |
| CO3 | **30.5** | 10 | - | - | - | 48.5 | 89 |
| CO4 | - | - | - | - | - | - | - |
| CO5 | - | - | - | - | - | - | - |
| CO6 | **2** | **-** | **-** | **-** | **-** | **-** | **2** |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2012** | **Duration** | **3hrs** |
| **Course Name** | **PROBLEMATIC SOILS AND THEIR MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Explain subsurface hardpan. | | CO3 | U | 1 |
| 2. | Define soil health. | | CO1 | R | 1 |
| 3. | Mention few applications of remote sensing and GIS in agriculture. | | CO5 | A | 1 |
| 4. | The clay percentage in vertisols is \_\_\_\_\_\_\_. | | CO1 | An | 1 |
| 5. | Expands USLE. | | CO3 | R | 1 |
| 6. | What is Browning of rice? | | CO3 | U | 1 |
| 7. | Define LCC. | | CO6 | R | 1 |
| 8. | Who is called as the father of soil science? | | CO5 | R | 1 |
| 9. | Explain any two water quality parameters. | | CO2 | U | 1 |
| 10. | What is the reclamation measure for acid soil? | | CO4 | A | 1 |
| 11. | Mention the management practices for soil crusting. | | CO4 | An | 1 |
| 12. | What is the reclamation measure for saline soil? | | CO4 | A | 1 |
| 13. | What is ‘R’horizon? | | CO1 | R | 1 |
| 14. | Give brief note on polluted water. | | CO2 | U | 1 |
| 15. | The infiltration rate for slowly permeable soil is \_\_\_\_\_\_\_. | | CO3 | R | 1 |
| 16. | Define quick lime. | | CO4 | R | 1 |
| 17. | Give brief note on waterlogged soils. | | CO4 | U | 1 |
| 18. | What is a soil health score card? | | CO1 | R | 1 |
| 19. | List out uses of bioremediation. | | CO4 | A | 1 |
| 20. | Write down the problems encountered in highly permeable soils. | | CO3 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the soil physical constraints in a brief manner. | | CO3 | U | 5 |
| 22. | Write down the strategies to improve soil health. | | CO1 | U | 5 |
| 23. | Enumerate the ill effects of soil compaction on crops. | | CO3 | A | 5 |
| 24. | Discuss the process of bio remediation of polluted soils through Multi-Purpose trees. | | CO4 | A | 5 |
| 25. | Explain in detail the characteristics of a cultivable waste land. | | CO1 | R | 5 |
| 26. | Categorize the wastelands based on causative agents and give its distribution in India. | | CO1 | U | 5 |
| 27. | Give a brief note saline water and its management measures. | | CO3 | R | 5 |
| 28. | Explain about the different types of soil erosion. | | CO3 | U | 5 |
| 29. | Discuss the management strategies of saline water. | | CO4 | A | 5 |
| 30. | Explain the formation of acid soils and describe its characters and reclamation measures. | | CO4 | A | 5 |
| 31. | Discuss in detail on land capability classification. | | CO6 | R | 5 |
| 32. | Write short notes on brackish water. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss in detail about irrigation water quality parameters. | CO2 | An | 8 |
|  | b. | Describe the formation of sodic soils, its characteristics and reclamation measures. | CO4 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the physical constraints in soils along with their management strategies. | CO3 | U | 8 |
|  | b. | Explain the process of bioremediation in detail. | CO1 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the applications of Remote sensing and GIS techniques in the diagnosis and management of problem soils. | CO5 | R | 8 |
|  | b. | List out the various chemical constraints in soil and explain its characters and reclamation measures. | CO3 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand soil quality and their categories. |
| CO2 | Distinguish problematic soils. |
| CO3 | Describe irrigation water quality standards. |
| CO4 | Apply soil reclamation practices for saline, sodic and acid soils. |
| CO5 | Understand remote sensing, GIS and bioremediation procedures. |
| CO6 | Identify land use patterns. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 8 | 10 | - | 8 | - | - | 26 |
| CO2 | 5 | 2 | - | 8 | - | - | 15 |
| CO3 | 14 | 20 | 5 | 1 | - | - | 40 |
| CO4 | 1 | 1 | 18 | 8 | - | - | 28 |
| CO5 | 9 | - | 1 | - | - | - | 10 |
| CO6 | 6 | - | - | - | - | - | 6 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2013** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL MARKETING, TRADE AND PRICES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | When NAFED was established? | | CO5 | R | 1 |
| 2. | Which is the federation established by GOI for marketing of forest products produced by the tribals in the country? | | CO5 | R | 1 |
| 3. | What is called as EXIM policy? | | CO2 | R | 1 |
| 4. | Define regulated market. | | CO2 | R | 1 |
| 5. | Which is the apex body of the state agricultural marketing boards? | | CO5 | R | 1 |
| 6. | Identify the risk caused in marketing due to fire, flood, rodents and pests? | | CO1 | A | 1 |
| 7. | What is PMFBY scheme related with? | | CO2 | R | 1 |
| 8. | Who gave the absolute advantage trade theory? | | CO6 | R | 1 |
| 9. | Where is the headquarters of APEDA located? | | CO5 | R | 1 |
| 10. | What is amber box, green box, blue box indicates in trade? | | CO6 | R | 1 |
| 11. | What is GATT? | | CO6 | R | 1 |
| 12. | What is called as speculative middle men? | | CO1 | R | 1 |
| 13. | Which are the scientific storage structures constructed for the protection of the quantity and quality of stored products? | | CO5 | R | 1 |
| 14. | Name the cooperative societies found at the base level of 2 tier or 3 tier structure. | | CO5 | R | 1 |
| 15. | What is minimum support price (MSP)? | | CO2 | R | 1 |
| 16. | When did the cooperative marketing societies act passed in India? | | CO5 | R | 1 |
| 17. | Which is the nodal agency for maintaining buffer stock in our country? | | CO4 | R | 1 |
| 18. | What is called as spot market? | | CO1 | R | 1 |
| 19. | What is called as copyright? | | CO6 | R | 1 |
| 20. | What is called as price elasticity of demand? | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Elaborate the activities of regulated market. | | CO2 | C | 5 |
| 22. | Explain contract farming with its merits and demerits. | | CO1 | U | 5 |
| 23. | Explain the various marketing strategies. | | CO1 | U | 5 |
| 24. | Explain absolute advantage trade theory. | | CO6 | U | 5 |
| 25. | Explain the activities of NAFED. | | CO5 | U | 5 |
| 26. | Explain the various marketing channels in India. | | CO4 | U | 5 |
| 27. | Explain marketing cost, marketing margin and price spread. | | CO3 | U | 5 |
| 28. | Explain the three important pillars in WTO. | | CO6 | U | 5 |
| 29. | Explain the role of government in supporting agricultural marketing. | | CO2 | U | 5 |
| 30. | Elaborate the various problems in agricultural marketing in India. | | CO2 | C | 5 |
| 31. | Explain the activities of food corporation of India. | | CO4 | U | 5 |
| 32. | Explain how to overcome the risks in agricultural marketing. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the different classification of markets. | CO1 | U | 7.5 |
|  | b. | Explain marketable and marketed surplus. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Elaborate the activities of different market functionaries. | CO1 | C | 7.5 |
|  | b. | Explain the types of warehouses in India. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the structure of cooperatives in India. | CO5 | U | 7.5 |
|  | b. | Explain market integration and market segmentation. | CO1 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Know the contours of agricultural market ecosystem, different market structures and their functions. |
| CO2 | Analyze the demand and supply problems in agricultural marketing systems, marketing efficiency and policies. |
| CO3 | Demonstrate the methods of valuation of farm assets |
| CO4 | Understand the food supply chain and its actors and activities. |
| CO5 | Gain practical skills on dealing with marketing institutions and warehouses. |
| CO6 | Understand international trade arrangements under WTO, Agreement on Agriculture (AOA) and EXIM policies |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 25 | 1 | - | - | 7.5 | 35.5 |
| CO2 | 5 | 22.5 | - | - | - | 5 | 32.5 |
| CO3 | - | 5 | - | - | - | - | 5 |
| CO4 | 1 | 10 | - | - | - | - | 11 |
| CO5 | 7 | 20 | - | - | - | - | 27 |
| CO6 | 4 | 10 | - | - | - | - | 14 |
|  | 19 | 92.5 | 1 | - | - | 12.5 | **125** |



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| **Course Code** | **18AG2019** | **Duration** | **3hrs** |
| **Course Name** | **CROP IMPROVEMENT - I (KHARIF CROPS)** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define emasculation and hybridization. | | CO3 | R | 1 |
| 2. | Define cleistogamy. | | CO3 | R | 1 |
| 3. | List the significant contribution of Dr.M.S.Swaminathan. | | CO4 | R | 1 |
| 4. | What is TGMS system? | | CO3 | U | 1 |
| 5. | Name the wild progenitor of Black gram and Green gram. | | CO1 | R | 1 |
| 6. | List the cultivated species of cotton. | | CO1 | R | 1 |
| 7. | What is the scientific name and chromosome number of maize? | | CO1 | R | 1 |
| 8. | Write a brief note on emasculation method in cotton. | | CO5 | U | 1 |
| 9. | What is a papillionaceous flower? | | CO3 | R | 1 |
| 10. | List out the wild relatives of sesamum with their beneficial traits. | | CO1 | R | 1 |
| 11. | What is detasseling? | | CO5 | U | 1 |
| 12. | List out the different races of rice. | | CO1 | R | 1 |
| 13. | What is protogyny? Give example | | CO3 | R | 1 |
| 14. | Expand NBPGR and IRRI | | CO3 | R | 1 |
| 15. | Who coined the term centre of origin? What is primary centre of origin? | | CO1 | R | 1 |
| 16. | What is ideotype breeding? | | CO6 | U | 1 |
| 17. | List the antinutritional compounds in kharif crop. | | CO6 | R | 1 |
| 18. | What is XENIA effect? | | CO1 | R | 1 |
| 19. | List the quality traits in cotton. | | CO6 | U | 1 |
| 20. | What is primary introduction? | | CO3 | U | 1 |
| PART – B (10 X 5 = 50 MARKS)  (Answer any 10 from the following) | | | | | |
| 21. | Explain the various emasculation methods in rice. | | CO5 | U | 5 |
| 22. | Distinguish between quantitative traits and qualitative traits with examples. | | CO2 | U | 5 |
| 23. | Explain how speed breeding is used in crop improvement. | | CO4 | U | 5 |
| 24. | What are the various classifications of maize cob types? | | CO1 | R | 5 |
| 25. | Explain pureline selection with suitable diagram and list its merits. | | CO3 | U | 5 |
| 26. | List the population improvement methods and describe any one method. | | CO3 | U | 5 |
| 27. | Explain the role of NBPGR in Plant genetic resources. | | CO1 | R | 5 |
| 28. | What is gene pool concept? Explain its various classifications. | | CO4 | U | 5 |
| 29. | What is an abiotic stress? Explain the various mechanisms in crops for drought mitigation. | | CO2 | R | 5 |
| 30. | Explain the various mechanisms that promote cross pollination in kharif groups. | | CO1 | U | 5 |
| 31. | Define heterosis. Explain the various methods of estimating heterosis. | | CO6 | A | 5 |
| 32. | Draw and explain the floral biology of red gram. | | CO5 | U | 5 |
| PART – C (2 X 15 = 30 MARKS)  (Answer any 2 from the following) | | | | | |
| 33. | a. | Explain the various yield trials used in plant breeding programmes. | CO6 | U | 7 |
|  | b. | Explain how crop wild relatives can be utilized for crop improvement programme. | CO4 | A | 8 |
|  |  |  |  |  |  |
| 34. | a. | Describe the various methods of conservation of plant genetic resources. | CO3 | U | 7 |
|  | b. | Draw the flow chart for pedigree method of breeding and explain the various stages. | CO6 | U | 8 |
|  |  |  |  |  |  |
| 35. | a. | Describe dominant gene transfer to improve an established variety with suitable diagram. | CO3 | U | 7 |
|  | b. | Suggest suitable breeding objectives for Rice crop improvement. | CO3 | A | 8 |

CO – COURSE OUTCOME BL – BLOOM’S LEVEL

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|  | COURSE OUTCOMES |
| CO1 | Remember the origin and diversity of different crops, components of inheritance and various crop improvement techniques |
| CO2 | Understand the genetics of qualitative and quantitative characters |
| CO3 | Remember different breeding procedures for genetic improvement of kharif crops |
| CO4 | Evaluate the adaptability, stability, quality parameters, biotic and abiotic stress of various kharif crops |
| CO5 | Utilize hybrid seed production in cultivation of kharif crops |
| CO6 | Design and conduct field experiments to analyse the quality characters of donor parents |

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| Assessment Pattern as per Bloom’s Taxonomy | | | | | | | |
| CO / P | R | U | A | An | E | C | Total |
| CO1 | 17 | 5 |  |  |  |  | 22 |
| CO2 | 5 | 5 |  |  |  |  | 10 |
| CO3 | 5 | 26 | 8 |  |  |  | 39 |
| CO4 | 1 | 10 | 8 |  |  |  | 19 |
| CO5 |  | 12 |  |  |  |  | 12 |
| CO6 | 1 | 17 | 5 |  |  |  | 23 |
|  | | | | | | | 125 |



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| **Course Code** | **18AG2020** | **Duration** | **3hrs** |
| **Course Name** | **MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Differentiate between inductive and deductive methodology of fertilizer recommendation. | | CO6 | An | 1 |
| 2. | Explain the Criteria of essentiality as proposed by Arnon and Stout. | | CO2 | R | 1 |
| 3. | Cite three Nitrogen supplying fertilizers with nutrient content. | | CO1 | R | 1 |
| 4. | Differentiate between Complex fertilisers and Mixed fertilisers. | | CO1 | U | 1 |
| 5. | List out few methods of soil fertility evaluation by plant analysis. | | CO5 | R | 1 |
| 6. | List few phosphorus solubilizing and mobilising biofertilizers. | | CO3 | R | 1 |
| 7. | Name few microorganisms used in soil fertility evaluation techniques. | | CO4 | R | 1 |
| 8. | The optimum C:N ratio in organic matter when neither mineralization nor immobilization occurs is \_\_\_\_\_\_\_\_\_. | | CO2 | U | 1 |
| 9. | List out the fertility ratings for nitrogen in soil. | | CO4 | R | 1 |
| 10. | Define nano fertilizers. | | CO1 | R | 1 |
| 11. | Name the microorganisms involved in the process of nitrification and denitrification. | | CO2 | R | 1 |
| 12. | Critical Limit Approach of fertilizer recommendation was given by \_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 13. | Identify the deficient nutrient for the given symptoms  a. Bitter pit of apples  b. Whip tail of cauliflower | | CO2 | U | 1 |
| 14. | Spell the nutrient composition of FYM. | | CO4 | R | 1 |
| 15. | Identify the deficient nutrient for the following deficiency symptoms  a. Interveinal chlorosis of older leaves  b. Khaira disease in paddy | | CO5 | U | 1 |
| 16. | Name the nutrient responsible for the smell or odour and taste of onion, garlic and mustard. | | CO5 | A | 1 |
| 17. | Find the nutrient associated with the Chick and Hen disease in Grape. | | CO5 | R | 1 |
| 18. | List the nutrient composition of DAP. | | CO1 | R | 1 |
| 19. | Give few examples of slow release nitrogenous fertilizers. | | CO1 | R | 1 |
| 20. | Mention the year of promulgation of The Fertilizer Control Order. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss on the role of organic manures in soil health and crop production. | | CO3 | A | 5 |
| 22. | Explain the methods of fertilizer application under rainfed and irrigated conditions. | | CO6 | An | 5 |
| 23. | Discuss in brief about fertilizer storage and Fertilizer Control Order. | | CO1 | U | 5 |
| 24. | Suggest cultivation practices that could improve Nitrogen Use Efficiency. | | CO4 | C | 5 |
| 25. | Describe potassium transformations in soil and factors affecting K availability. | | CO2 | U | 5 |
| 26. | Discuss the importance and advantages of nano fertilizers. | | CO1 | A | 5 |
| 27. | Classify the nitrogenous fertilizers based on its composition and properties. | | CO1 | R | 5 |
| 28. | Explain the preparation of any 2 composts. | | CO3 | U | 5 |
| 29. | Explain the mechanisms of nutrient transport to plants. | | CO2 | U | 5 |
| 30. | Classify the phosphorus fertilizers based on its composition and properties. | | CO1 | An | 5 |
| 31. | Evaluate the fertility of soil through soil testing. | | CO4 | A | 5 |
| 32. | Explain the different methods of soil fertility evaluation through plant analysis. | | CO4 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Illustrate the nitrogen transformations in soil with a neat diagram. | CO2 | U | 7 |
|  | b. | Appraise the application of advanced techniques like remote sensing, precision farming in plant nutrient management. | CO3 | E | 8 |
|  |  |  |  |  |  |
| 34. | a. | Illustrate with neat diagram the functions and deficiency symptoms of primary and secondary nutrients in plants. | CO5 | A | 7 |
|  | b. | Appraise the various fertilizer recommendation approaches practiced in India. | CO3 | E | 8 |
|  |  |  |  |  |  |
| 35. | a. | Illustrate with neat diagram the functions and deficiency symptoms of micronutrients in plants. | CO5 | A | 7 |
|  | b. | Justify the adoption of Integrated Nutrient Management practices for sustained crop production. | CO3 | C | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the properties of manures, fertilizers and soil amendments |
| CO2 | Summarize the concepts of soil fertility and plant nutrition and chemistry of nutrients in soil. |
| CO3 | Demonstrate Integrated Nutrient Management and fertilizer recommendation practices |
| CO4 | Evaluate the fertility of soil |
| CO5 | Analyze the plant nutrient content |
| CO6 | Recommend fertilizer dosage for different soil types |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 6 | 5 | 5 |  |  | 26 |
| CO2 | 2 | 19 |  |  |  |  | 21 |
| CO3 | 1 | 5 | 5 |  | 16 | 8 | 35 |
| CO4 | 3 |  | 5 | 5 |  | 5 | 18 |
| CO5 | 2 | 1 | 15 |  |  |  | 18 |
| CO6 | 1 |  | 6 |  |  |  | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2021** | **Duration** | **3hrs** |
| **Course Name** | **DISEASES OF FIELD & HORTICULTURAL CROPS AND THEIR MANAGEMENT - I** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Brown colored spindle shaped spots produced on leaf, neck, node and grain of paddy plant is the characteristic symptom of which disease? | | CO2 | R | 1 |
| 2. | Quote the alternate host for sorghum rust. | | CO3 | R | 1 |
| 3. | Recognize the disease in which creamy sticky sugary honeydew like liquid is released from the grains and ovaries. | | CO4 | R | 1 |
| 4. | Name the phanerogamic parasite that grows on tobacco. | | CO1 | R | 1 |
| 5. | Report the vector that transmits Peanut bud necrosis virus. | | CO3 | A | 1 |
| 6. | Enumerate the typical symptom of Lakshmi disease (false smut) of paddy. | | CO2 | R | 1 |
| 7. | Identify the crop disease which is charcterized by the formation of orange coloured pustules on leaves. | | CO2 | R | 1 |
| 8. | Name the vector that transmits Mung bean yellow mosaic virus. | | CO3 | R | 1 |
| 9. | Recall the disease of paddy caused due to zinc deficiency. | | CO5 | R | 1 |
| 10. | Write the specific fungicide used for the management of downy mildew. | | CO6 | A | 1 |
| 11. | Black encrustation on the leaves, stem, flowers and fruits, indicates which disease? | | CO3 | U | 1 |
| 12. | Name the algal disease of guava. | | CO1 | R | 1 |
| 13. | Write the two virus particles associated with Rice Tungro Virus. | | CO4 | A | 1 |
| 14. | White powdery growth on upper surface of leaf can be correlated with which disease? | | CO2 | U | 1 |
| 15. | Report the disease which can be extensively managed by Sulphur spray. | | CO6 | A | 1 |
| 16. | Leaf spot with concentric rings in crucifers is related with which disease? | | CO2 | U | 1 |
| 17. | Name one phytoplasma disease of brinjal along with its vector. | | CO4 | R | 1 |
| 18. | Mention one disease of coconut which is caused by a viroid. | | CO1 | R | 1 |
| 19. | Kresek is the characteristic symptom of which disease? | | CO2 | U | 1 |
| 20. | Cite the vector for Bhendi vein clearing virus. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate the symptoms and pathogen characters of Panama wilt and Moko wilt of banana. | | CO2 | An | 5 |
| 22. | Explain the symptoms of sheath rot and sheath blight of rice. | | CO2 | U | 5 |
| 23. | Summarize the symptoms of black shank of tobacco and freckle leaf spot of banana. | | CO3 | E | 5 |
| 24. | Describe the symptoms of yellow and black sigatoka of banana | | CO1 | U | 5 |
| 25. | Differentiate between early and late tikka leaf spot of groundnut. | | CO2 | An | 5 |
| 26. | Describe the symptoms of red rust of guava and white rust of crucifers. | | CO2 | U | 5 |
| 27. | Distinguish the symptoms and spore characters of sorghum smuts. | | CO4 | U | 5 |
| 28. | Explain the symptoms of Bacterial leaf blight of paddy and heart rot of banana. | | CO5 | An | 5 |
| 29. | Describe the symptoms of Pigeon pea sterility mosaic disease. | | CO2 | U | 5 |
| 30. | Summarize the symptoms of Web blight and bacterial blight of soyabean. | | CO2 | E | 5 |
| 31. | Explain in detail the symptoms of Papaya ringspot virus and bacterial leaf spot of pomegranate. | | CO3 | U | 5 |
| 32. | Explain the symptoms of Phomopsis blight of brinjal. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the symptoms, etiology of pathogen and management for Blister blight of tea and Coffee rust. | CO6 | U | 8 |
|  | b. | Differentiate the symptoms of downy mildew of maize, sorghum and bajra. | CO2 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the symptoms of basal stem rot and root wilt of coconut along with their management. | CO6 | U | 8 |
|  | b. | List and explain the symptoms of viral diseases of banana. | CO5 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the symptoms of club root of cabbage and black leg of cabbage | CO2 | U | 8 |
|  | b. | List down the important diseases of tomato and describe the symptoms and management of damping of and early blight of tomato. | CO3 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Remember the factors responsible for disease development |
| CO2 | Understand the importance of different plant pathogens with their characteristics and classification |
| CO3 | Recall the reproduction, survival and transmission of plant pathogens |
| CO4 | Outline the mode of dispersal, role of enzymes and toxins in disease development |
| CO5 | Analyze defense mechanism in plants and the epidemiological factors |
| CO6 | Apply knowledge on plant disease management |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 5 | - | - | - | - | 8 |
| CO2 | 3 | 31 | - | 17 | 5 | - | 56 |
| CO3 | 10 | 6 | 1 | - | 5 | - | 22 |
| CO4 | 1 | 6 | 1 | - | - | - | 8 |
| CO5 | 8 | - |  | 5 | - | - | 13 |
| CO6 | - | 16 | 2 | - | - | - | 18 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **18AG2022** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF INTEGRATED PEST AND DISEASE MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The diseases infection spreads from the point of infection to entire plant system within a period of time and remains invisible is termed as --------------- | | CO1 | U | 1 |
| 2. | Expand: WDP | | CO2 | R | 1 |
| 3. | Give an example for larval parasitoid. | | CO2 | A | 1 |
| 4. | The ability of the host to resist the harmful effect of the pathogens is ------------ | | CO3 | U | 1 |
| 5. | Directorate of Plant Protection, Quarantine & Storage is located at -------------- | | CO2 | R | 1 |
| 6. | Name the fungicide that controls the damping off disease ------------------- | | CO2 | An | 1 |
| 7. | Give an example for fungal bio-control agent? | | CO4 | A | 1 |
| 8. | Expand: NBAIR | | CO1 | R | 1 |
| 9. | Example for systemic insecticides --------------------- | | CO5 | E | 1 |
| 10. | Destruction of seedling near the soil surface resulting in the falling of seedlings on the ground is called as --------------- | | CO1 | R | 1 |
| 11. | The resistance is controlled by many genes is called as --------------- | | CO3 | R | 1 |
| 12. | Give an example for antifungal antibiotic ------------- | | CO4 | E | 1 |
| 13. | Give an example for mechanical method for insect pest management ------------ | | CO2 | A | 1 |
| 14. | The use of trap crop is a ---------------- method of IPM | | CO5 | A | 1 |
| 15. | Name the fungicide used for the control of rust disease -------------- | | CO5 | R | 1 |
| 16. | ----------- and ---------- are the terms introduced by Vander Plank in 1963 | | CO6 | An | 1 |
| 17. | The pathogen completes its life cycle only once during the crop season is termed as ----------------- | | CO1 | R | 1 |
| 18. | Pest population that produces incremental damage equal to the cost of preventing the damage is ------------- | | CO1 | U | 1 |
| 19. | Give an example for Amphimobile or Amphisystemic fungicide. | | CO6 | An | 1 |
| 20. | Name the forecasting model for rice blast disease. | | CO4 | E | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe in detail about classification of fungicides based on mobility in plants. | | CO1 | A | 5 |
| 22. | Differentiate Vertical and Horizontal resistance. | | CO1 | U | 5 |
| 23. | Define: 1. Economic Injury Level, 2. Sporadic pests, 3. Regular pest, 4. Plant quarantine and 5. Physical control | | CO2 | R | 5 |
| 24. | Briefly explain about the safety issues while handling the pesticides. | | CO5 | An | 5 |
| 25. | Explain in detail about political, social and legal implications of IPM. | | CO6 | A | 5 |
| 26. | Expand the following: 1. AESA, 2. NPV, 3. HPR, 4. GEP and 5. LD50 | | CO4 | R | 5 |
| 27. | Briefly explain the basic principles of plant disease management. | | CO1 | R | 5 |
| 28. | Enlist any five economically important plant diseases with their causal organism. | | CO3 | U | 5 |
| 29. | Describe the economic importance of insect pests | | CO1 | An | 5 |
| 30. | Enumerate any five damage symptoms caused by insect pest along with suitable examples. | | CO5 | A | 5 |
| 31. | Briefly explain in detail about the biochemical resistance. | | CO3 | E | 5 |
| 32. | Explain the categories of insect pests along with examples. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the classification of different insecticides. | CO6 | R | 8 |
|  | b. | What is HPR? Explain the three mechanisms of HPR with suitable examples. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Illustrate the classification of fungicides based on general use along with examples. | CO3 | An | 8 |
|  | b. | List the different morphological resistance in plants and explain any five methods. | CO5 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Illustrate the classification of plant diseases based on occurrence and geographical distribution along with suitable examples. | CO1 | R | 8 |
|  | b. | Explain in detail about the mechanism of bio-control agents. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Remember the important concepts and principles of Integrated pest and disease management practices |
| CO2 | Understand and demonstrate the various tools of IPM - Cultural, Mechanical, Physical, Biological, Legal and Chemical control |
| CO3 | Apply the knowledge to develop Integrated pest and disease management strategies |
| CO4 | Analyze the pest outbreak through pest monitoring, forecasting and surveillance methods |
| CO5 | Create the awareness among farmers about the importance of IPM and help them to implement the suitable IPM practices based on AESA |
| CO6 | Evaluate the political, social, and legal implication of implemented IPM |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 16 | 7 | 5 | 5 | - | - | 33 |
| CO2 | 7 | 12 | 2 | 1 | - | - | 22 |
| CO3 | 1 | 6 | - | 8 | 5 | - | 20 |
| CO4 | 5 | - | 1 | - | 2 | - | 8 |
| CO5 | 1 | 7 | 13 | 5 | 1 | - | 27 |
| CO6 | 8 | - | 5 | 2 | - | - | 15 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2023** | **Duration** | **3hrs** |
| **Course Name** | **PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the pest that attacks a month-old sorghum crop after sowing and continues to infest up to the emergence of ear head. | | CO2 | R | 1 |
| 2. | The presence of ants for honeydew secretion near the root zone in Finger millet is an indication of……. | | CO2 | R | 1 |
| 3. | Terminal rolling and drying of leaves from tip to base in both rice nursery and main field are due to……. | | CO2 | R | 1 |
| 4. | Corky outgrowth on Guava fruit is due to --------------- pest. | | CO2 | U | 1 |
| 5. | Mention whether the leafcutter bee using cut leaf bits from rose plants is an example of feeding or non-feeding injury to the plant. | | CO2 | U | 1 |
| 6. | Groundnut field shows burnt appearance when severely infested with ----------- | | CO2 | R | 1 |
| 7. | ---------------is the scientific name of sunflower capitulum borer. | | CO1 | R | 1 |
| 8. | Write the scientific name of Bihar hairy caterpillar infesting the sunflower. | | CO1 | R | 1 |
| 9. | Write the scientific name of the castor butterfly. | | CO1 | R | 1 |
| 10. | Silvery sheen on the lower surface of the leaf in the early stages of cotton is caused by---- | | CO2 | U | 1 |
| 11. | Name the major pest in the early growth stage of the sugarcane. | | CO3 | An | 1 |
| 12. | Internodes constricted and shortened, with a number of boreholes and fresh excreta in the nodal region in sugarcane is due to----- | | CO2 | R | 1 |
| 13. | --------------- is the scientific name of coconut black headed caterpillar. | | CO1 | R | 1 |
| 14. | Holes on the coconut trunk with brownish ooze is a symptom caused by -------- | | CO2 | U | 1 |
| 15. | Attacked brinjal fruits with boreholes plugged with excreta is an indication of the presence of ------------- | | CO2 | An | 1 |
| 16. | Site of pupation for fruit fly is -------------- | | CO3 | U | 1 |
| 17. | Name two major pests of crucifers. | | CO1 | R | 1 |
| 18. | *Lanka ramakrishnai (*previously referred to as *Longitarsus nigripennis)* is an important pest of ------ crop. | | CO1 | R | 1 |
| 19. | Vector of bunchy top disease in banana is -------- | | CO3 | An | 1 |
| 20. | List two stored product pests carried from field to storage with scientific names. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Categorize pests based on occurrence and number of host plants attacked with examples. | | CO3 | R | 5 |
| 22. | Discuss the bollworm complex of cotton and recommend the management practices. | | CO2 | A | 5 |
| 23. | Enlist the nature of the damage done by early shoot borer, top shoot borer, and internodal borer in sugarcane. | | CO2 | U | 5 |
| 24. | Discuss any three major pests of brinjal and recommend the management practices. | | CO2 | A | 5 |
| 25. | Differentiate Rhizome weevil and pseudostem borer in banana. | | CO1 | An | 5 |
| 26. | Discuss any three major pests of coconut along with details on their management. | | CO2 | A | 5 |
| 27. | Enlist the reasons for pest outbreaks. | | CO3 | An | 5 |
| 28. | Discuss any three major pests of mango along with details on their management. | | CO2 | A | 5 |
| 29. | Enumerate any three major pests of coffee and their management. | | CO2 | A | 5 |
| 30. | List out the pod borer complex in pulses and their management. | | CO2 | A | 5 |
| 31. | Enumerate any three primary storage pests that are internal feeders. | | CO4 | R | 5 |
| 32. | Enlist the major pests of sorghum and describe the nature of damage and management of sorghum shoot fly. | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write a brief account of five major insect pests of rice. Suggest measures for their management. | CO2 | A | 7.5 |
|  | b. | Enumerate the types of injury by insect pests to plants with examples. | CO3 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Enlist the important pests of guava with their damage symptoms and management practices. | CO2 | A | 7.5 |
|  | b. | Discuss the major pests of chilli along with their management practices. | CO2 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Enlist the important pests of citrus with their damage symptoms and management practices. | CO2 | A | 7.5 |
|  | b. | Write a brief account of the major insect pests of stored produce. Suggest measures for their management. | CO4 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | | **COURSE OUTCOMES** | | | | | | | |
| CO1 | | Remember morphology and taxonomic characteristics of insect pests affecting crops and stored grains | | | | | | | |
| CO2 | | Understand nature and type of damage by different arthropods pest in field, vegetable, fruit and plantation crops, ornamental crops, spices and condiments | | | | | | | |
| CO3 | | Analyze factors influencing pest occurrence, distribution and control measures | | | | | | | |
| CO4 | | Summarize factors affecting losses of stored grains, role of various factors in deterioration of grain and their management strategies | | | | | | | |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | | | |
| **CO / P** | | **R** | **U** | **A** | **An** | **E** | **C** | **Total** | |
| CO1 | | 7 |  |  | 5 |  |  | 12 | |
| CO2 | | 5 | 9 | 65 | 1 |  |  | 80 | |
| CO3 | | 5 | 1 |  | 14.5 |  |  | 20.5 | |
| CO4 | | 5 |  | 7.5 |  |  |  | 12.5 | |
| CO5 | |  |  |  |  |  |  |  | |
| CO6 | |  |  |  |  |  |  |  | |
|  | | | | | | | | **125** | |



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| **Course Code** | **18AG2026** | **Duration** | **3hrs** |
| **Course Name** | **INTELLECTUAL PROPERTY RIGHTS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Where is the headquarters of World Trade Organization (WTO) located? | | CO1 | R | 1 |
| 2. | Who are the beneficiaries of related rights? | | CO2 | R | 1 |
| 3. | Give example for use of patent in daily life. | | CO2 | U | 1 |
| 4. | Mention the year of Protection of Plant Varieties and Farmers Right Act. | | CO4 | R | 1 |
| 5. | State the objectives of the convention on biological diversity. | | CO6 | R | 1 |
| 6. | List out the treaties under WIPO. | | CO1 | U | 1 |
| 7. | Write about fundamental principles of TRIPS. | | CO1 | R | 1 |
| 8. | Define Intellectual Property Rights (IPR). | | CO1 | R | 1 |
| 9. | List the basic principles of Berne convention. | | CO2 | U | 1 |
| 10. | Under which article of Convention on Biological Diversity (CBD), 1992, explanation of traditional knowledge was given. | | CO6 | R | 1 |
| 11. | Write the Laws for protection geographical indication in India. | | CO3 | R | 1 |
| 12. | Discuss about the duration under patent, copy right and trademark. | | CO3 | R | 1 |
| 13. | List the qualities of trade secret. | | CO2 | U | 1 |
| 14. | What is microchip? | | CO2 | R | 1 |
| 15. | What is Madrid protocol related to? | | CO2 | R | 1 |
| 16. | What is the process patent? | | CO2 | R | 1 |
| 17. | What is the need of Patent? | | CO3 | An | 1 |
| 18. | Write about post grant opposition. | | CO3 | U | 1 |
| 19. | Expand ITPGRFA. | | CO5 | R | 1 |
| 20. | Name the DUS test guidelines for new plant species under PPV&FR act. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Elaborate the functions of World Intellectual Property Organization (WIPO). | | CO1 | U | 5 |
| 22. | Why new varieties of plants are protected? | | CO4 | An | 5 |
| 23. | Give the explanation on traditional knowledge as provided under Convention on Biological Diversity (CBD), 1992. | | CO6 | U | 5 |
| 24. | Illustrate and explain the patent system in India. | | CO2 | An | 5 |
| 25. | What rights do copy right provide? | | CO2 | R | 5 |
| 26. | Discuss about international and national phases under Patent Cooperation Treaty (PCT). | | CO3 | U | 5 |
| 27. | Explain the convention behind the protection of copy right. | | CO2 | R | 5 |
| 28. | Write about the traditional Knowledge Digital Library (TKDL). | | CO5 | U | 5 |
| 29. | Explain trademark and how they are protected. | | CO3 | R | 5 |
| 30. | How is a trademark registered? How extensive is trademark protection? | | CO3 | R | 5 |
| 31. | Write about the defensive protection and positive protection. | | CO5 | U | 5 |
| 32. | Discuss the Red Sanders case and PepsiCo-seaweed case regarding biological diversity in India. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What are the benefits of protecting copy rights and related rights and how have they kept up with advances in technology? | CO2 | R | 7.5 |
|  | b. | What kind of inventions is not patentable in India? | CO3 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the management system of Biological Diversity Act. | CO6 | U | 7.5 |
|  | b. | Discuss the Budapest treaty. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Give the introduction and origin of the International Union for the Protection of New Varieties of Plants (UPOV) and the exceptions and limitations in UPOV 1991. | CO4 | R | 7.5 |
|  | b. | Write about the three popular cases that brought the legacy of Indian traditional knowledge in the international arena. | CO5 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand GATT, WTO, TRIPs and WIPO for IPR protection |
| CO2 | Know to acquire the patent and copyright for their innovative work |
| CO3 | Remember plagiarism, which can be questioned legally |
| CO4 | Explain UPOV and PPV & FR Act of India |
| CO5 | Apply, Analyze and use ITK strategies |
| CO6 | Achieve new innovative goals |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 6 | - | - | - | - | 9.00 |
| CO2 | 21.50 | 10.50 | - | 5 | - | - | 37.00 |
| CO3 | 12 | 13.50 | - | 1 | - | - | 26.50 |
| CO4 | 8.5 | 1 | - | 5 | - | - | 14.50 |
| CO5 | 1 | 17.5 | - | - | - | - | 18.50 |
| CO6 | 2 | 17.5 | - | - | - | - | 19.50 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2027** | **Duration** | **3hrs** |
| **Course Name** | **RAINFED AGRICULTURE AND WATERSHED MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | About ---------- % of net sown area of the country is rainfed. | | CO6 | C | 1 |
| 2. | 2,4-D is a ---------- type of anti-transpirant. | | CO1 | R | 1 |
| 3. | ---------- is an intercropping system suitable for drylands. | | CO3 | A | 1 |
| 4. | Expand CRIDA. | | CO6 | R | 1 |
| 5. | Expand NRAA. | | CO6 | R | 1 |
| 6. | ---------- and ---------- contingency crop planning is suggested for early withdrawal of monsoon. | | CO1 | An | 1 |
| 7. | ICAR-CRIDA is located at ---------- | | CO5 | R | 1 |
| 8. | The first dryland research station in India was established at ---------- | | CO2 | U | 1 |
| 9. | Crop failure is relatively less in ---------- farming. | | CO3 | A | 1 |
| 10. | Dryland farming is cultivation of crops in regions with annual rainfall less than 750 mm. (TRUE/FALSE). | | CO1 | U | 1 |
| 11. | The term “arid” is derived from a Latin word, “arere” which means ---------- | | CO1 | U | 1 |
| 12. | Define intercropping with example. | | CO4 | A | 1 |
| 13. | Define PGR. | | CO2 | R | 1 |
| 14. | Define conservation agriculture. | | CO1 | U | 1 |
| 15. | Ideotypes for dryland farming should possess ----------and ----------characters. | | CO6 | R | 1 |
| 16. | ICRISAT has been established in ---------- year. | | CO1 | R | 1 |
| 17. | The size of micro watershed is ---------- hectares. | | CO2 | R | 1 |
| 18. | Define aridity index with formula. | | CO2 | U | 1 |
| 19. | What are the five arid zones of the world. | | CO6 | C | 1 |
| 20. | Define crop substitution with example. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write in detail about the characteristics of dryland agriculture. | | CO2 | U | 5 |
| 22. | List different principles of watershed management. | | CO3 | E | 5 |
| 23. | Explain about different mulching techniques to reduce the evaporation losses in dryland farming. | | CO5 | R | 5 |
| 24. | Describe labour saving tillage implements used in dryland farming. | | CO1 | U | 5 |
| 25. | a) Define apparent drought and physiological frought. (2 Marks)  b) Classify the drought based on time of occurrence. (3 Marks) | | CO1 | U | 5 |
| 26. | Explain the three principles of conservation agriculture. | | CO4 | A | 5 |
| 27. | Explain about mid-season correction or dry spells during crop period. | | CO2 | R | 5 |
| 28. | Classification of anti-transpirants. | | CO2 | C | 5 |
| 29. | Integrated farming systems in drylands. | | CO3 | U | 5 |
| 30. | Differentiate dry farming, dryland farming and rainfed farming. | | CO4 | E | 5 |
| 31. | Explain the advantages and constraints of conservation agriculture. | | CO5 | An | 5 |
| 32. | Explain the non-monetory inputs used for crop production in dryland agriculture. | | CO5 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain classification of drought. | CO6 | E | 7.5 |
|  | b. | Write a short note on Contingent crop planning. | CO3 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain about in-situ moisture conservation techniques in dryland farming. | CO3 | An | 7.5 |
|  | b. | List the agro-techniques to mitigate the water stress in dryland farming. | CO6 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the method of water harvesting in arid regions. | CO2 | R | 7.5 |
|  | b. | Write about runoff inducing and land alteration techniques in water harvesting. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Remember the concepts of rain fed agriculture |
| CO2 | Understand the soil moisture conservation approaches and integrated dry land farming technologies |
| CO3 | Apply the knowledge of watershed management techniques to promote dry land agriculture |
| CO4 | Understand the various integrated technologies |
| CO5 | Appy the knowledge of Alternate Land Use |
| CO6 | Understand about various organization in dry land farming research |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 13 | - | 1 | - | - | 17 |
| CO2 | 14.5 | 7 | - | - | - | 5 | 26.5 |
| CO3 | - | 12.5 | 9.5 | 7.5 | 5 | - | 34.5 |
| CO4 | - | - | 6 | - | 5 | - | 11 |
| CO5 | 6 | - | - | 10 | - | - | 16 |
| CO6 | 3 | - | - | 7.5 | 7.5 | 2 | 20 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2029** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF ORGANIC FARMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the green manure cum shade crop in plantations. | | CO3 | R | 1 |
| 2. | Indicate the fundamental basis of organic farming. | | CO1 | U | 1 |
| 3. | Give an example of ex situ conservation of biodiversity. | | CO1 | A | 1 |
| 4. | Which type of manures are known as organic nitrogen fertilizers? | | CO2 | An | 1 |
| 5. | Name the system of cultivation of 2 or more crops of different heights together. | | CO3 | U | 1 |
| 6. | What is the minimum conversion period for annual crops from the date of starting organic management? | | CO1 | An | 1 |
| 7. | Give an example of in situ conservation of biodiversity. | | CO1 | A | 1 |
| 8. | Indicate the nitrogen content in fish meal. | | CO2 | R | 1 |
| 9. | Give an example of non edible oil cake. | | CO2 | R | 1 |
| 10. | Which is the manure produced from liquid and solid waste of sugar mill? | | CO4 | An | 1 |
| 11. | Indicate the NPK content in press mud. | | CO2 | R | 1 |
| 12. | Name a multipurpose tree doing nitrogen fixation in soil. | | CO4 | R | 1 |
| 13. | Which is the most efficient earthworm used in vermicomposting? | | CO1 | R | 1 |
| 14. | Which is the insect used to control water hyacinth? | | CO2 | An | 1 |
| 15. | Which is the byproduct of thermal power plant, used as a manure? | | CO4 | U | 1 |
| 16. | Which is the system of farming involving crops, livestock, birds and trees? | | CO4 | U | 1 |
| 17. | Name the program by Govt. of India on organic procedures. | | CO5 | A | 1 |
| 18. | Name the alternative system of organic certification for reducing its cost. | | CO5 | U | 1 |
| 19. | Indicate the general shelf life for bio inputs. | | CO1 | R | 1 |
| 20. | Name one accreditation agency for organic products approved by Govt. of India. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define allelopathy. How allelopathic effect is made use in organic farming? | | CO3 | An | 5 |
| 22. | What are the disadvantages of organic farming? | | CO1 | U | 5 |
| 23. | List out the organic standards in food processing. | | CO5 | A | 5 |
| 24. | Write a note on guidelines of organic animal husbandry. | | CO5 | R | 5 |
| 25. | What are the advantages of composting? | | CO2 | U | 5 |
| 26. | Describe the method of preparation of coir pith compost and indicate its nutrient composition. | | CO4 | U | 5 |
| 27. | Substantiate the role of mulching in soil health management. | | CO1 | A | 5 |
| 28. | What are the major forms of organic carbon in soil and list out the effect of organic matter on soil properties? | | CO1 | R | 5 |
| 29. | Enumerate the steps to successful organic transition. | | CO1 | A | 5 |
| 30. | What are the environmental effects of organic farming? | | CO1 | An | 5 |
| 31. | Narrate the role of Government in promotion of organic agriculture in India. | | CO5 | U | 5 |
| 32. | Describe vermicompost production method and indicate its nutritive value. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What do you mean by organic certification? What are the important processes involved in it? | CO5 | U | 8 |
|  | b. | Give a note on organic certification in India. | CO6 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Describe non chemical methods of weed management indicating preventive, physical, cultural and mechanical measures. | CO2 | C | 8 |
|  | b. | Explain biological methods of weed control. | CO2 | E | 7 |
|  |  |  |  |  |  |
| 35. | a. | Describe the benefits and problems in organic farming. | CO1 | An | 8 |
|  | b. | List out the facilitating factors for the greening of Indian agriculture. | CO1 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Remember the concepts of organic farming |
| CO2 | Understand the crop management practices and technologies of various crops |
| CO3 | Recall the different cropping systems of Tamil Nadu |
| CO4 | Compare the organic crop production with inorganic crop production |
| CO5 | Apply the knowledge of standards, certification process |
| CO6 | Analyze different marketing strategies of organic farm products |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 6 | 19 | 14 |  |  | 46 |
| CO2 | 8 | 5 |  | 2 | 7 | 8 | 30 |
| CO3 | 1 | 1 | 5 |  |  |  | 7 |
| CO4 | 1 | 7 |  | 1 |  |  | 9 |
| CO5 | 6 | 14 | 6 |  |  |  | 26 |
| CO6 |  |  |  | 7 |  |  | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2030** | **Duration** | **3hrs** |
| **Course Name** | **DISEASES OF FIELD AND HORTICULTURAL CROPS AND THEIR MANAGEMENT-II** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Write the causal organism of white blisters in mustard. | | CO1 | A | 1 |
| 2. | Give two examples of chlamydospore forming fungus. | | CO3 | U | 1 |
| 3. | Name the vector for cotton leaf curl virus. | | CO4 | R | 1 |
| 4. | Write two examples of bacterial disease in apple. | | CO2 | A | 1 |
| 5. | Illustrate the characters of uredospore and teliospore of wheat rust. | | CO3 | A | 1 |
| 6. | Define microcyclic rust. | | CO1 | R | 1 |
| 7. | Give an example of root rot pathogen with its causal organism. | | CO3 | U | 1 |
| 8. | Name the causal organism of purple blotch disease in onion. | | CO2 | R | 1 |
| 9. | Cite an example of acervuli producing fungus. | | CO3 | U | 1 |
| 10. | Name the biocontrol agent used for seed treatment. | | CO6 | R | 1 |
| 11. | Write the typical symptoms of malformation in mango. | | CO2 | A | 1 |
| 12. | Quote any two seed borne diseases. | | CO3 | R | 1 |
| 13. | Write the specific symptom of black spot disease in rose. | | CO2 | A | 1 |
| 14. | Name the perithecia producing pathogen. | | CO3 | R | 1 |
| 15. | Write the specific fungicide used to manage downy mildew. | | CO6 | A | 1 |
| 16. | Quote the chemical involved in the emission of pineapple smell in sugarcane due to sett rot disease. | | CO3 | R | 1 |
| 17. | Write the causal organism of yellow ear rot disease in wheat. | | CO1 | A | 1 |
| 18. | Name the transmitting agents of Sugarcane grassy shoot and Citrus greening disease. | | CO4 | R | 1 |
| 19. | Red algal rust is caused by………… | | CO2 | R | 1 |
| 20. | Illustrate the pathogen character of *Erysiphe.* | | CO3 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the diagnostic symptom of mango anthracnose and its management. | | CO6 | A | 5 |
| 22. | Summarize the symptoms of *Alternaria* blight in sunflower. | | CO2 | E | 5 |
| 23. | Illustrate the leaf curl disease in peach with suitable symptoms, disease cycle and management with a neat diagram. | | CO4 | A | 5 |
| 24. | Explain citrus canker with neat diagram along with the recommended management practices. | | CO2 | An | 5 |
| 25. | Describe the symptoms, mode of spread and management of grassy shoot of sugarcane. | | CO4 | U | 5 |
| 26. | Summarize the symptoms of bacterial wilt of cucumber along with its vector and management. | | CO6 | E | 5 |
| 27. | Write the causal organism for the following diseases.   1. Ascochyta blight in Bengal gram 2. Lentil rust 3. Sooty mould in mango 4. Birds eye spot in grapes 5. Apple scab | | CO3 | A | 5 |
| 28. | Differentiate the symptoms and pathogen characters of downy mildew and powdery mildew disease in grapes. | | CO2 | An | 5 |
| 29. | Explain symptoms and management of stem galldisease in coriander. | | CO3 | U | 5 |
| 30. | Describe the symptoms and management of damping off disease in chilli. | | CO5 | R | 5 |
| 31. | Write the causal organism, symptoms, and management of fire blightdisease in apple. | | CO4 | A | 5 |
| 32. | Explain Late blight disease in Potato with neat diagram. | | CO2 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the symptoms, mode of spread, disease cycle of wheat stem rust and its integrated management practices. | CO4 | An | 8 |
|  | b. | Distinguish *Verticillium* wilt and *Fusarium* wilt of Cotton. | CO3 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | List out any five important diseases of apple with causal organism. Explain crown gall disease in apple and its management. | CO6 | R | 8 |
|  | b. | Explain the symptoms, mode of spread and management of red rot disease in sugarcane. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the five important symptoms of bacterial blight of cotton with neat diagrams. Explain their mode of spread and integrated management practices. | CO5 | U | 8 |
|  | b. | Enumerate the symptoms, causal organism and mode of spread of viral diseases in potato. | CO4 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall various plant pathological terms and basic concepts of important plant diseases |
| CO2 | Explain the disease symptoms of various plant diseases of field and horticultural crops |
| CO3 | Interpret the host pathogen interaction on disease development in field and horticultural crops |
| CO4 | Determine the prevalence, epidemiology and factors affecting disease development |
| CO5 | Apply the concept of integrated management practices to control diseases of field and horticultural crops |
| CO6 | Recommend management practices for diseases of different crop plants |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | - | 2 | - | - | - | 3 |
| CO2 | 2 | 7 | 3 | 15 | 5 | - | 32 |
| CO3 | 3 | 8 | 7 | - | 7 | - | 25 |
| CO4 | 9 | 5 | 10 | 8 | - | - | 32 |
| CO5 | 5 | 8 | - | - | - | - | 13 |
| CO6 | 9 | - | 6 | - | 5 | - | 20 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **18AG2031** | **Duration** | **3hrs** |
| **Course Name** | **POST-HARVEST MANAGEMENT AND VALUE ADDITION OF FRUITS AND VEGETABLES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Write the percentage of postharvest loss in fruits and vegetables in India. | | CO1 | R | 1 |
| 2. | Name any two Class -II preservative. | | CO3 | R | 1 |
| 3. | Name two institutes working on postharvest management of fruits and vegetables. | | CO1 | A | 1 |
| 4. | Mention the other name for irradiation. | | CO3 | R | 1 |
| 5. | What is palletization? | | CO3 | A | 1 |
| 6. | What is weeping of jelly? | | CO3 | U | 1 |
| 7. | Who is known as father of canning? | | CO1 | R | 1 |
| 8. | Give the minimum TSS specified by FSSAI for fruit squash. | | CO3 | U | 1 |
| 9. | Give an example for oxygen scrubber. | | CO5 | U | 1 |
| 10. | What is sheet or flake test? | | CO3 | R | 1 |
| 11. | Name the equipment used for measuring fruit firmness. | | CO2 | R | 1 |
| 12. | Give the chemical formula of Potassium metabisulphite. | | CO3 | R | 1 |
| 13. | Write any one maturity index for harvesting banana. | | CO1 | U | 1 |
| 14. | Expand CFB box. | | CO5 | R | 1 |
| 15. | Define field heat. | | CO2 | U | 1 |
| 16. | What is sauerkraut? | | CO3 | U | 1 |
| 17. | Name the equipment used for measuring TSS. | | CO3 | R | 1 |
| 18. | Name the precursor of ethylene. | | CO2 | R | 1 |
| 19. | Deficiency of which nutrient will leads to bitter pit in apple. | | CO2 | An | 1 |
| 20. | Expand FSSAI. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define degreening. | | CO3 | R | 5 |
| 22. | Differentiate between physiological maturity and horticultural maturity. | | CO2 | U | 5 |
| 23. | Distinguish between climacteric and non-climacteric fruits. | | CO1 | U | 5 |
| 24. | Write a note on drying and dehydration. | | CO4 | E | 5 |
| 25. | Write notes on shrink wrap packaging, its advantages. | | CO5 | A | 5 |
| 26. | Write the steps involved in preparation of fruit jam. | | CO3 | A | 5 |
| 27. | Summarize different fermentation methods employed in fruit and vegetable processing. | | CO1 | E | 5 |
| 28. | Discuss the preservation by freezing. | | CO1 | An | 5 |
| 29. | Summarize different storage disorders. | | CO5 | An | 5 |
| 30. | Write the methods for determination of end point in jam preparation. | | CO3 | A | 5 |
| 31. | Write about the prospects of postharvest technology sector. | | CO1 | U | 5 |
| 32. | What is precooling? Elaborate different precooling methods. | | CO3 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write in detail the different storage methods for fruits and vegetables. | CO3 | An | 7.5 |
|  | b. | Distinguish between active packaging and intelligent packaging. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Analyze the causes of postharvest losses in fruits and vegetables in India. | CO1 | A | 7.5 |
|  | b. | Discuss the preharvest factors affecting postharvest quality in fruits and vegetables. | CO3 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Elaborate the changes occuring during ripening. | CO2 | E | 7.5 |
|  | b. | Write in detail on curing, waxing and irradiation. | CO2 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Importance of post-harvest management of fruits and vegetables |
| CO2 | Understand the factors causing post-harvest losses in fruits and vegetables |
| CO3 | Explain about the principles and methods of preservation |
| CO4 | Explain recent advances in food preservation techniques |
| CO5 | Recommend suitable storage structures and packaging methods for postharvest management of fruits and vegetables |
| CO6 | Demonstrate knowledge about the different government schemes and laws in import and export of fruits and vegetables |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 11 | 8.5 | 5 | 5 | - | 31.5 |
| CO2 | 2 | 6 | - | 8.5 | 7.5 | - | 24 |
| CO3 | 10 | 3 | 18.5 | 12.5 | - | - | 44 |
| CO4 | - | - | - | - | 5 | - | 5 |
| CO5 | 1 | 8.5 | 5 | 5 | - | - | 19.5 |
| CO6 | 1 | - | - | - | - | - | 1 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2032** | **Duration** | **3hrs** |
| **Course Name** | **CROP IMPROVEMENT II (Rabi crops)** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Differentiate inbreeding and inbreeding depression. | | CO2 | A | 1 |
| 2. | The superior performance of hybrid over both the parents is known as ------------------ | | CO2 | R | 1 |
| 3. | Diadelphous stamens are the feature of ------------------ family. | | CO1 | R | 1 |
| 4. | Brimato is developed by grafting technique (True or false) | | CO1 | U | 1 |
| 5. | The center of origin for potato is ---------------------. | | CO1 | R | 1 |
| 6. | What is base collection? | | CO2 | A | 1 |
| 7. | Individual Plant Progeny row selection is a feature of bulk breeding (True/False). | | CO2 | A | 1 |
| 8. | What are all the modes of asexual reproduction in crops? | | CO1 | U | 1 |
| 9. | Differentiate autopolyploid and allopolyploid. | | CO2 | An | 1 |
| 10. | DMH-11 is a transgenic mustard released in India (True/False). | | CO6 | R | 1 |
| 11. | The headquarters of NBPGR is situated at ------------. | | CO1 | R | 1 |
| 12. | ------------ proposed the concept of Ideotype. | | CO3 | R | 1 |
| 13. | Mention the self-pollinated rabi cereal. | | CO1 | R | 1 |
| 14. | The stress caused by non-living organisms in plants is known as ------------ | | CO3 | U | 1 |
| 15. | Define genetic advance. | | CO1 | U | 1 |
| 16. | ---------------------- is the chromosome number and --------- is the origin of horse gram. | | CO1 | R | 1 |
| 17. | ----------------------- is the autopolyploid rabi crop. | | CO3 | R | 1 |
| 18. | Define germplasm. | | CO2 | R | 1 |
| 19. | The degree of inbreeding is measured in terms of ------------------- | | CO2 | U | 1 |
| 20. | CIMMYT is located at -------------- | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Briefly explain the evolution of tetraploid and hexaploid wheat. | | CO2 | U | 5 |
| 22. | Explain the characteristic features of desi and Kabuli chickpeas. | | CO1 | U | 5 |
| 23. | Briefly explain the evolution of brassica with a flow chart. | | CO2 | U | 5 |
| 24. | Explain the hybrid seed production in Sunflower. | | CO4 | U | 5 |
| 25. | Describe the floral biology of Safflower. | | CO2 | U | 5 |
| 26. | Explain the true potato seed technology. | | CO2 | A | 5 |
| 27. | Explain the floral biology and objectives of tomato. | | CO2 | U | 5 |
| 28. | Define germplasm and explain its types. | | CO3 | U | 5 |
| 29. | Briefly explain the germplasm activities. | | CO3 | U | 5 |
| 30. | Define genetic erosion. What are the major reasons for genetic erosion. | | CO3 | U | 5 |
| 31. | Differentiate vertical and horizontal resistance. | | CO6 | U | 5 |
| 32. | Explain the different types of seeds. | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Differentiate traditional breeding and ideotype breeding. | CO3 | An | 8 |
|  | b. | Explain the features of rice ideotypes. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Briefly explain the steps involved in the release of a variety. | CO6 | U | 8 |
|  | b. | Define gene pool. Explain the types of the gene pool with examples. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Write a short note on In-situ and Ex-situ conservation of germplasm. | CO3 | U | 8 |
|  | b. | Define drought stress. What are the mechanisms of drought stress? | CO6 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Remember the origin and diversity of different crops, components of inheritance, and various crop improvement techniques |
| CO2 | Understand different breeding techniques for the genetic improvement in rabi crops |
| CO3 | Evaluate the adaptability, stability, quality parameters, biotic and abiotic stresses of various rabi crops |
| CO4 | Make use of hybrid seed production techniques in farming of rabi crops |
| CO5 | Examine hybrid seed production methods |
| CO6 | Apply the knowledge to develop climate-resilient crop varieties |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 9 | - | - | - | - | 14 |
| CO2 | 2 | 21 | 8 | 1 | - | - | 32 |
| CO3 | 7 | 38 | - | 8 | - | - | 53 |
| CO4 | - | - | 5 | - | - | - | 5 |
| CO5 | - | - | - | - | - | - | 0 |
| CO6 | 1 | 13 | 7 | - | - | - | 21 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2033** | **Duration** | **3hrs** |
| **Course Name** | **MANAGEMENT OF BENEFICIAL INSECTS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Apiculture. | | CO2 | U | 1 |
| 2. | Name the honey bee species that cannot be domesticated. | | CO2 | An | 1 |
| 3. | Cultivation of mulberry plants is known as -------------. | | CO5 | U | 1 |
| 4. | Royal jelly is secreted by ----------------. | | CO2 | R | 1 |
| 5. | Name the highest yielding mulberry variety with its yield (ton/ha/year). | | CO5 | R | 1 |
| 6. | Quote an example for egg parasitoid. | | CO4 | R | 1 |
| 7. | Give the name of non-domesticated honeybee species. | | CO2 | An | 1 |
| 8. | Define Dearth period. | | CO6 | U | 1 |
| 9. | Name the insect biocontrol agent introduced from Mexico into India for the control of parthenium. | | CO4 | R | 1 |
| 10. | Infer the gland that secretes royal jelly/bee milk in honeybee. | | CO2 | U | 1 |
| 11. | Name any two broad spectrum bed disinfectants used in sericulture. | | CO4 | R | 1 |
| 12. | Multivoltine races will undergo ………… generation in a year. | | CO4 | U | 1 |
| 13. | Write the scientific name of Indian bee. | | CO2 | R | 1 |
| 14. | Name the scientist who discovered the bee dance. | | CO2 | R | 1 |
| 15. | Give any two examples for insect pollinators. | | CO4 | U | 1 |
| 16. | Write the scientific name of mulberry silkworm. | | CO5 | R | 1 |
| 17. | Quote an example for insect predator. | | CO4 | R | 1 |
| 18. | Write the two major constituents of honey. | | CO2 | U | 1 |
| 19. | What is bee bread? | | CO2 | R | 1 |
| 20. | Define Swarming. | | CO6 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out important by products of honey bee and their uses. | | CO2 | An | 5 |
| 22. | Describe the structural modification in honey bee legs. | | CO2 | U | 5 |
| 23. | Write in detail about the importance of beneficial insects. | | CO1 | U | 5 |
| 24. | Discuss on different lac products and their uses. | | CO2 | An | 5 |
| 25. | Recommend the seasonal management practices to be followed in apiary. | | CO6 | A | 5 |
| 26. | Illustrate the mulberry varieties and their fertilizer recommendation. | | CO5 | U | 5 |
| 27. | Differentiate the five important honeybee species available in India. | | CO2 | An | 5 |
| 28. | Enumerate the major pests of mulberry and their management. | | CO5 | An | 5 |
| 29. | Summarize the Bee communication with neat diagram. | | CO2 | U | 5 |
| 30. | Discuss on Bee pasturage and list the plant sources for nectar and pollen collection | | CO6 | An | 5 |
| 31. | Relate the different types of propagation methods of mulberry. | | CO5 | U | 5 |
| 32. | Describe the structure of silk gland and their functions. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Enumerate the mass production techniques for *Trichogramma chilonis.* | CO3 | A | 8 |
|  | b. | Discuss on apiary management practices in different seasons. | CO6 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Discuss on important insect predators in agriculture ecosystem and explain mass multiplication procedure for any one predator. | CO4 | A | 8 |
|  | b. | Explain about economic classification of beneficial insects. | CO3 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the important pests and diseases of silkworms with nature of damage and management. | CO5 | An | 8 |
|  | b. | Write in detail on equipments used in commercial beekeeping with their uses. | CO6 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the importance of beneficial insects. |
| CO2 | Describe the morphology, biology and behaviour of beneficial insects. |
| CO3 | Identify the common parasitoids and predators used in biological control. |
| CO4 | Mass-multiply the natural enemies. |
| CO5 | Rear silkworms applying innovative techniques. |
| CO6 | Practice beekeeping for commercial purpose |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 5 | - | - | - | - | 5 |
| CO2 | 4 | 18 | - | 17 | - | - | 39 |
| CO3 | - | - | 8 | 7 | - | - | 16 |
| CO4 | 4 | 2 | 8 | - | - | - | 13 |
| CO5 | 2 | 11 | - | 13 | - | - | 26 |
| CO6 | 7 | 2 | 5 | 12 | - | - | 26 |
|  | | | | | | | **125** |



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| **Course Code** | **18AG2035** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF FOOD SCIENCE AND NUTRITION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is bound water? | | CO1 | R | 1 |
| 2. | Syrups are purified by------------process. | | CO2 | An | 1 |
| 3. | Formula for Density is --------- | | CO1 | R | 1 |
| 4. | Rancidity occurs in oil due to----------- | | CO1 | U | 1 |
| 5. | Amino acids are the building blocks of ----------- | | CO2 | U | 1 |
| 6. | Based on the source, food is classified into -------- and ------------ | | CO4 | U | 1 |
| 7. | Name the Pathway by which glucose is converted in to ATP. | | CO3 | U | 1 |
| 8. | Define Food Fiber. | | CO3 | R | 1 |
| 9. | --------- is the commonly used food preservative in Bakery products. | | CO3 | R | 1 |
| 10. | Gluten is the protein present in maize True or False. | | CO4 | R | 1 |
| 11. | Name a trace element present in food. | | CO 4 | An | 1 |
| 12. | --------is the sugar present in milk. | | CO3 | R | 1 |
| 13. | ----------- is the most commonly used Flavoring agent. | | CO5 | An | 1 |
| 14. | Define water activity. | | CO3 | R | 1 |
| 15. | Abbreviate LBV protein. | | CO5 | U | 1 |
| 16. | Phyto chemical present in turmeric is-------- | | CO4 | R | 1 |
| 17. | Onions when cut produces ----------Flavor. | | CO3 | U | 1 |
| 18. | Banana is rich in ----------- &------------- | | CO6 | An | 1 |
| 19. | Saponification is the process of ------------- | | CO1 | R | 1 |
| 20. | Chemical agent for Buttery Flavor--------- | | CO2 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Elaborate any two physical properties of food. | | CO1 | R | 5 |
| 22. | Comment on the types of water present in foods with examples. | | CO1 | U | 5 |
| 23. | Tabulate sugars present in food and their function. | | CO2 | R | 5 |
| 24. | Define bioactive compounds and write a note on any two bioactive compounds. | | CO 2 | An | 5 |
| 25. | Elaborate the chemical reactions that happens to protein during the process of cooking. | | CO2 | R | 5 |
| 26. | Write any two chemical reactions of fat. | | CO2 | A | 5 |
| 27. | Comment on water soluble vitamins and their importance. | | CO3 | A | 5 |
| 28. | Correlate anemia with iron deficiency. | | CO3 | R | 5 |
| 29. | Write a brief note on nutritional disorders. | | CO6 | U | 5 |
| 30. | ‘Nutraceuticals’ - A new trend in food science –Discuss. | | CO5 | U | 5 |
| 31. | Outline the main features of modified diets. | | CO5 | R | 5 |
| 32. | Describe the methods of drying used in preserving foods. | | CO3 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Classify carbohydrates based on their chemical composition and elaborate their role in human health. | CO5 | R | 7 |
|  | b. | Write about the production process of three Fermented Food and a note on their health benefits. | CO2 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Relate the energy metabolism of Carbohydrate, fat and protein with a flow chart. | CO4 | R | 7 |
|  | b. | Explain the current Indian scenario on malnourishment and explain its control measures. | CO4 | U | 8 |
|  |  |  |  |  |  |
| 35. | a. | Sketch the Principles and methods of food preservation using low temperature. | CO6 | A | 7 |
|  | b. | Briefly discuss the bacteria involved in food spoilage. | CO2 | An | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the concepts of food science. |
| CO2 | Enumerate and describe food composition and food chemistry. |
| CO3 | Demonstrate the principles and methods of food processing. |
| CO4 | Analyze the methods to control microbes and preserve food. |
| CO5 | Identify the nutritional disorders. |
| CO6 | Design balanced/modified diet to meet consumer needs. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 8 | 7 | - | - | - | - | 15 |
| CO2 | 10 | 9 | 5 | 14 | - | - | 38 |
| CO3 | 9 | 2 | 5 | 5 | - | - | 21 |
| CO4 | 9 | 9 | - | 1 |  |  | 19 |
| CO5 | 12 | 6 | - | - | - | - | 18 |
| CO6 | 5 | - | 7 | 1 | - | - | 13 |
|  | | | | | | | **125** |



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| **Course Code** | **18AT2043** | **Duration** | **3hrs** |
| **Course Name** | **PROTECTED CULTIVATION AND SECONDARY AGRICULTURE** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the instrument used to measure relative humidity. | | CO3 | R | 1 |
| 2. | What is the wavelength range of Ultraviolet Radiation? | | CO2 | U | 1 |
| 3. | Give an example of short day plant. | | CO2 | U | 1 |
| 4. | What is the acceptable range of relative humidity inside the Greenhouse | | CO2 | R | 1 |
| 5. | Name the type of wood used for construction of low cost Greenhouse. | | CO1 | R | 1 |
| 6. | What is the disadvantage of using polyethylene film as a covering material? | | CO1 | U | 1 |
| 7. | What is meant by passive ventialation in Greenhouse? | | CO1 | U | 1 |
| 8. | What does the shade factor 15% mean in the usage of Shade Nets? | | CO3 | A | 1 |
| 9. | Name this type of greenhouse, when its two roof slopes are of equal pitch and width. | | CO1 | R | 1 |
| 10. | What is meant by Greenhouse effect? | | CO2 | U | 1 |
| 11. | \_\_\_\_\_\_\_\_\_is defined as the ratio of mass of the sample to its true volume excluding the open and closed pores. | | CO4 | R | 1 |
| 12. | What is the maximum permissible belt speed in the belt conveyor? | | CO6 | R | 1 |
| 13. | As Moisture content increases the angle of repose ……………… | | CO4 | U | 1 |
| 14. | What is the shape of the trough in the screw conveyor? | | CO6 | U | 1 |
| 15. | In Deep bed drying technique the maximum air temperature should be \_\_\_\_\_\_\_\_\_\_\_\_oC. | | CO5 | R | 1 |
| 16. | Which type of the dryer has inverted V shaped channels in the drying chamber in which hot air is passed? | | CO5 | R | 1 |
| 17. | Rheology is the study of ………….. | | CO4 | R | 1 |
| 18. | Write the formula to find the coefficent of friction. | | CO4 | R | 1 |
| 19. | Desired moisture content of agriculture produce (cereals, pulses and millets) at the time of storing should be \_\_\_\_\_\_\_ % | | CO5 | R | 1 |
| 20. | What is the difference between misters and foggers? | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate Shade net Vs Greenhouse. | | CO3 | U | 5 |
| 22. | Compare short day plants Vs Long day plants and give examples. | | CO1 | U | 5 |
| 23. | Elaborate the different types of greenhouse classification based on the covering materials. | | CO3 | U | 5 |
| 24. | What is meant by low cost greenhouse? How it benefits the farmer? | | CO1 | A | 5 |
| 25. | Briefly explain the frictional properties that are considered for handling biological materials. | | CO4 | R | 5 |
| 26. | Elaborate the working principle of screw conveyor. | | CO6 | U | 5 |
| 27. | Draw a neat sketch indicating all the basic structural components of a greenhouse and briefly explain about them. | | CO3 | U | 5 |
| 28. | Write a short note on the any one direct method of determination of moisture content. | | CO5 | R | 5 |
| 29. | Explain any one type of active winter cooling system with a neat sketch. | | CO2 | R | 5 |
| 30. | Elaborate the working principle of bucket elevator. | | CO6 | U | 5 |
| 31. | Explain the drying rate periods. | | CO5 | U | 5 |
| 32. | List the factors to be considered while selecting a location for the construction of a greenhouse. | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | How the plants response inside the greenhouse environment? Explain briefly. | CO2 | U | 7.5 |
|  | b. | Elaborate the various components of a drip irrigation system in a detailed manner. Draw a neat sketch of drip irrigation system and label the parts. | CO3 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Why LSU dryers are used commercially for drying paddy grains? Elaborate its importance and working principle. | CO5 | A | 7.5 |
|  | b. | What are the types of solar dryer? Explain its working principle. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | What are the physical properties that are considered for handling biological materials? Explain briefly. | CO4 | U | 7.5 |
|  | b. | Classify the greenhouse types based on shape with a neat diagram. | CO1 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Plan and design low cost green houses |
| CO2 | Predict the plant responses to greenhouse environment |
| CO3 | Understand the production and the economics of protected cultivation |
| CO4 | Understand engineering properties of food materials |
| CO5 | Explain the working of commercial grain dryers |
| CO6 | Illustrate the material handling equipment |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 9.5 | 7 | 5 |  |  |  | 21.5 |
| CO2 | 6 | 10.5 | 5 |  |  |  | 21.5 |
| CO3 | 8.5 | 16 | 1 |  |  |  | 25.5 |
| CO4 | 8 | 8.5 | - |  |  |  | 16.5 |
| CO5 | 8 | 12.5 | 7.5 |  |  |  | 28 |
| CO6 | 1 | 11 | - |  |  |  | 12 |
|  | | | | | | | **125** |



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| **Course Code** | **18CS1001** | **Duration** | **3hrs** |
| **Course Name** | **INFORMATION AND COMMUNICATION TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | **CO** | **BL** | **Marks** |
|  | **PART – A (20X1 = 20 MARKS)** | | | |
|  | Define Nyquist theorem. | CO5 | R | 1 |
|  | Identify the decimal value of the binary fraction 0.1011. | CO1 | R | 1 |
|  | Identify the entity. “The algorithm is expressed more precisely using a programming language” . | CO3 | U | 1 |
|  | The memory need for 2 mins of song is 2.5 MB. Estimate the number of 2 mins songs can be stored in a 64 MB storage device. | CO1 | An | 1 |
|  | Name the physical devices that are used for storage and processing of data in computers. | CO3 | R | 1 |
|  | Identify the element used to fabricate DRAM. | CO5 | U | 1 |
|  | Recall the organization that evolved a standard code to represent characters to be stored and processed by computers. | CO2 | R | 1 |
|  | Identify the program which allows entering text using keyboard. | CO1 | R | 1 |
|  | ROM uses semiconductor memory cells which can be permanently placed in one of two states 0 or 1. Recall the name of the process. | CO1 | R | 1 |
|  | Record the decimal number of a binary number 10111. | CO4 | U | 1 |
|  | Expand MIDI. | CO1 | R | 1 |
|  | Expand TIFF. | CO5 | R | 1 |
|  | Expand NIU. | CO4 | R | 1 |
|  | Recognize the element which is used to create visually pleasing display of documents on the computer connected to internet. | CO2 | R | 1 |
|  | Identify the base that is used in Hexadecimal system. | CO2 | U | 1 |
|  | Expand DTP. | CO4 | R | 1 |
|  | Calculate the bytes of memory required for storing 1 minute telephone message. (Hint: Consider the no. of samples per second is 6700). | CO2 | A | 1 |
|  | Discover the element that assists the users to carryout operations of creating, storing, accessing, editing, updating and querying a database. | CO2 | A | 1 |
|  | State the notation that is a more concise numerical representation. | CO4 | R | 1 |
|  | In a screen of 640 x 480 pixels, each pixel needs 3 bytes to represent color with 30 frames per second. Calculate the storage size that is required to store 1 second video. | CO5 | A | 1 |

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|  | **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | |
|  | Write the functionality of memory cell functions and its properties. | CO1 | R | 5 |
|  | Tabulate the different image file formats with their applications, advantages. | CO5 | R | 5 |
|  | Sketch the block diagram of MP3 music system. | CO2 | A | 5 |
|  | State the different functions of operating system. | CO2 | R | 5 |
|  | Illustrate the connection between PCs/LANs and telephone lines. | CO4 | A | 5 |
|  | State the use of spreadsheets. | CO4 | R | 5 |
|  | State the hexadecimal representation of decimal numbers from 0 to 15. | CO1 | R | 5 |
|  | Tabulate the objectives and applications of different types of graphic processing. | CO4 | R | 5 |
|  | Sketch the interconnection of CPU with memory and I/O units. | CO3 | A | 5 |
|  | Explain the generation of audio output. | CO5 | U | 5 |
|  | State the number of bits used to represent the amplitudes of telephone conversations. | CO3 | R | 5 |
|  | Write the classification of programming languages based on applications. | CO3 | A | 5 |

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|  | **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | |
| 33. | a. | Illustrate the fundamentals of image compression and give examples of them. | CO2 | A | 10 |
| b. | Examine the different types of computer networks and their applications. | CO4 | A | 5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the procedure to be followed to capture a moving scene with a video camera. | CO5 | U | 15 |
|  |  |  |  |  |  |
| 35. | a. | Write the various physical devices that are used as memory cells. | CO3 | A | 15 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | The student will be able to classify different forms of data |
| CO2 | The student will be able to acquire different forms of data |
| CO3 | The student will be able to analyze the working of hardware and software |
| CO4 | The student will be able to organize the data |
| CO5 | The student will be able to work on technologies related to multimedia and Internet |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 14 | - | - | 1 | - | - | 15 |
| CO2 | 7 | 1 | 17 | - | - | - | 25 |
| CO3 | 6 | 1 | 25 | - | - | - | 32 |
| CO4 | 13 | 1 | 10 | - | - | - | 24 |
| CO5 | 7 | 21 | 1 | - | - | - | 29 |
|  | | | | | | | **125** |



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| **Course Code** | **18CS2001** | **Duration** | **3hrs** |
| **Course Name** | **BASICS OF COMPUTER PROGRAMMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Variables defined inside a function are called \_\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 2. | The entry-controlled loop in C is \_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 3. | C language was invented by\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 4. | Define union. | | CO1 | U | 1 |
| 5. | Give an example of character constant. | | CO1 | U | 1 |
| 6. | State the escape sequence of tab. | | CO1 | U | 1 |
| 7. | \_\_\_\_\_\_\_\_\_\_ is the format specifier used for character. | | CO1 | U | 1 |
| 8. | List the usage of function. | | CO1 | U | 1 |
| 9. | List any two examples of logical operator. | | CO1 | U | 1 |
| 10. | Differentiate String and Character. | | CO1 | An | 1 |
| 11. | Define conditional operator. | | CO1 | U | 1 |
| 12. | List any two libraries in C programming. | | CO1 | U | 1 |
| 13. | \_\_\_\_\_\_ is the size of the float variable. | | CO1 | U | 1 |
| 14. | State the usage of stdio library. | | CO1 | U | 1 |
| 15. | Define software. | | CO1 | U | 1 |
| 16. | List any two applications of computer. | | CO1 | U | 1 |
| 17. | Differentiate linux and windows operating system. | | CO1 | An | 1 |
| 18. | List any two rules of a variable. | | CO1 | U | 1 |
| 19. | Name any one decision control statement. | | CO1 | U | 1 |
| 20. | Give any one example of two-dimensional array. | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the characteristics of computers. | | CO1 | U | 5 |
| 22. | Design the truth table for bitwise OR and XOR operator. | | CO2 | C | 5 |
| 23. | Explain about the various types of constants. | | CO2 | U | 5 |
| 24. | Describe the continue statement with suitable example. | | CO2 | U | 5 |
| 25. | Develop an c program to find whether the person is eligible for voting or not based on the given age. | | CO3 | C | 5 |
| 26. | Report on switch case statement by creating a calculator with basic arithmetic operation. | | CO2 | U | 5 |
| 27. | Explain various string handling functions with suitable example programs. | | CO2 | R | 5 |
| 28. | Develop a C program to find the sum of n number using array. | | CO4 | C | 5 |
| 29. | Develop a C program to create a structure for student details (sno, name, fees) and access the same. | | CO6 | C | 5 |
| 30. | Describe the structure in detail. | | CO2 | U | 5 |
| 31. | List any five applications of structure in the real world and explain the same. | | CO5 | R | 5 |
| 32. | Demonstrate factorial using function. | | CO6 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the various generations of computer. | CO2 | U | 7 |
|  | b. | Describe the various data types in C. | CO3 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Solve the following  (734) 10 = ( ) 2  (652) 8 = ( ) 2  (B23) 16 = ( ) 10  (1000111) 2 = ( ) 8  (100) 2 = ( ) 16 | CO1 | C | 15 |
|  |  |  |  |  |  |
| 35. | a. | Summarize Internet and the types of Internet Connections. | CO1 | U | 8 |
|  | b. | Define Call by Reference. Create a C program to swap two numbers  using call by Reference. | CO1 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the fundamental principles of programming. |
| CO2 | Gain knowledge on the concepts of structured programming. |
| CO3 | Understand logics of solving problems. |
| CO4 | Solve problems using basic programming techniques. |
| CO5 | Apply programming to solve real world problems. |
| CO6 | Illustrate the role of programming in real life scenarios. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 31 |  | 2 |  | 22 | 55 |
| CO2 |  | 27 |  |  |  | 5 | 32 |
| CO3 |  | 8 |  |  |  | 5 | 13 |
| CO4 |  |  |  |  |  | 5 | 5 |
| CO5 | 5 |  |  |  |  |  | 5 |
| CO6 |  |  | 5 |  |  | 5 | 10 |
|  | | | | | | | **125** |



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| **Course Code** | **18HO2013** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF ORNAMENTAL HORTICULTURE AND LANDSCAPE ARCHITECTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define xeriscaping. | | CO1 | R | 1 |
| 2. | List out two gardens of India that are laid in an informal style. | | CO3 | R | 1 |
| 3. | Name two hardscape components proposed in landscape design for climbers | | CO1 | R | 1 |
| 4. | Define Moribana. | | CO4 | R | 1 |
| 5. | Define arboretum. | | CO1 | R | 1 |
| 6. | Name two shrubs with the botanical name. | | CO2 | R | 1 |
| 7. | Define dish garden. | | CO4 | R | 1 |
| 8. | List out four garden adornments. | | CO1 | R | 1 |
| 9. | List out four important features used in water gardening. | | CO1 | R | 1 |
| 10. | List out two turf grasses used in lawn-making. | | CO4 | R | 1 |
| 11. | Terrace and Charbagh are the features of \_\_\_\_\_\_\_\_\_ garden. | | CO3 | R | 1 |
| 12. | List out two importance of CAD. | | CO5 | R | 1 |
| 13. | Name two flowering climbers with the botanical name. | | CO2 | R | 1 |
| 14. | List out the achievements made by Mr. Patrick Blanc and Prof. Lancelot Hogben. | | CO5 | R | 1 |
| 15. | Write two important components of the Japanese garden. | | CO3 | R | 1 |
| 16. | Which is the quickest method of establishing of lawn? | | CO4 | An | 1 |
| 17. | List any two plants suitable for bonsai making with the botanical name. | | CO4 | R | 1 |
| 18. | Name two cacti with the botanical name. | | CO2 | R | 1 |
| 19. | Define sunken garden | | CO4 | R | 1 |
| 20. | The garden styles followed in French gardens and Japanese gardens are\_\_\_\_\_\_&\_\_\_\_\_\_\_\_\_\_. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the benefits and limitations of roof gardens. | | CO4 | R | 5 |
| 22. | Discuss the benefits of lawns and methods of establishment. | | CO4 | U | 5 |
| 23. | Differentiate Topiary and Trophy. | | CO4 | An | 5 |
| 24. | Discuss landscape design for an educational institution. | | CO5 | U | 5 |
| 25. | Differentiate formal and informal styles of garden. | | CO3 | An | 5 |
| 26. | Explain the planning, designing, and establishment of the bog garden. | | CO3 | R | 5 |
| 27. | Write the functional uses of trees, palms, and succulents in landscaping. | | CO4 | U | 5 |
| 28. | Differentiate annuals and biennials. | | CO2 | R | 5 |
| 29. | List the four Mughal gardens of India with place of location. | | CO2 | An | 5 |
| 30. | Summarize the principle of terrarium along with the method of establishment. | | CO4 | U | 5 |
| 31. | Explain the components of the English garden. | | CO3 | U | 5 |
| 32. | Discuss the types of vertical garden. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Illustrate the bonsai styles and their classification. | CO4 | U | 7.5 |
|  | b. | Explain the various aspects involved in the maintenance of lawns. | CO4 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the steps involved in the establishment of a terrace garden. | CO4 | U | 7.5 |
|  | b. | Write the scope and importance of landscaping. | CO1 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss landscape design for a home garden. | CO5 | U | 7.5 |
|  | b. | Classify different types of flower arrangements with a neat diagram. | CO4 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the principles of ornamental horticulture and landscape design |
| CO2 | Explain the different ornamental crops and their suitability for different landscapes |
| CO3 | Distinguish the different garden types in India and abroad |
| CO4 | Design the lawns, floral arrangements, terrariums, xeriscaping, and bonsai-making |
| CO5 | Discover different landscaping designs and architectures using AutoCAD and ArchiCAD |
| CO6 | Identify the factors affecting landscape design and planning |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 12.5 | - | - | - | - | - | 12.5 |
| CO2 | 8.0 | - | - | 5.0 | - | - | 13.0 |
| CO3 | 9.0 | 5.0 | - | 5.0 | - | - | 19.0 |
| CO4 | 10.0 | 37.5 | - | 13.5 | - | - | 61.0 |
| CO5 | 2.0 | 17.5 | - | - | - | - | 19.5 |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



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| **Course Code** | **18HO2014** | **Duration** | **3hrs** |
| **Course Name** | **DRYLAND HORTICULTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Growing crops in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_situation is known as dry land horticulture. | | CO1 | R | 1 |
| 2. | Dryland crops require \_\_\_\_\_\_\_\_\_\_\_\_ water for their survival. | | CO2 | R | 1 |
| 3. | In India, dryland cultivation is \_\_\_\_\_\_\_\_\_\_\_ compared to irrigated agriculture. | | CO2 | R | 1 |
| 4. | \_\_\_\_\_\_\_\_\_\_\_\_ rain is a problem in dryland agriculture. | | CO2 | R | 1 |
| 5. | Atmospheric humidity will be \_\_\_\_\_\_\_\_\_ in drylands. | | CO2 | R | 1 |
| 6. | Rain shadow area is one where rainfall will be normally \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 7. | In dryland areas, water resources will be normally \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 8. | By\_\_\_\_\_\_\_\_\_\_\_\_\_\_ we can save the soil moisture from evaporation. | | CO2 | R | 1 |
| 9. | The highest loss of water in drylands is happening through \_\_\_\_\_\_\_\_ by high temperature. | | CO2 | R | 1 |
| 10. | Loss of top layer of soil by rains is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | R | 1 |
| 11. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ irrigation is the method by which water savings will be high. | | CO2 | R | 1 |
| 12. | Creation of small farm ponds is known as \_\_\_\_\_\_\_\_\_\_\_\_\_development. | | CO2 | R | 1 |
| 13. | Terracing is a common method of soil conservation in hilly areas (True/ False). | | CO4 | R | 1 |
| 14. | Forming \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_around trees is a method of water conservation. | | CO2 | R | 1 |
| 15. | Conserving water at the site where rains are received is known as \_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 16. | Use of \_\_\_\_\_\_\_\_\_\_\_\_\_ on plants is a way of reducing transpiration. | | CO3 | R | 1 |
| 17. | \_\_\_\_\_\_\_\_\_\_\_\_grafting is a method of infusing drought tolerance. | | CO6 | R | 1 |
| 18. | Deep planting is a technique to fight against drought. | | CO6 | R | 1 |
| 19. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is one mechanism of avoiding transpiration loss by plants. | | CO5 | R | 1 |
| 20. | Seedling trees are better than grafted plants for drought management (True/ False) | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Enumerate the importance of dryland horticulture. | | CO1 | R | 5 |
| 22. | Appraise the constraints faced in drylands. | | CO1 | E | 5 |
| 23. | Differentiate soil erosion and run off losses. | | CO4 | An | 5 |
| 24. | List out few techniques followed in dryland horticulture. | | CO6 | R | 5 |
| 25. | Explain watershed development and write down the methods. | | CO3 | An | 5 |
| 26. | Explain *in situ* water harvesting method. | | CO2 | An | 5 |
| 27. | Explain the methods of reducing evapotranspiration. | | CO6 | U | 5 |
| 28. | Define water use efficiency and the ways to achieve it. | | CO2 | R | 5 |
| 29. | Illustrate the role of mulches in dryland horticulture. | | CO6 | A | 5 |
| 30. | Discuss the influence of climatic parameters in arid zones. | | CO4 | U | 5 |
| 31. | Compare drip and sprinkler systems of irrigation. | | CO6 | E | 5 |
| 32. | Summarize the plant modifications observed in dryland crops. | | CO5 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss about ber, the king of arid zone fruits. | CO3 | U | 7.5 |
|  | b. | Write about aonla-varieties, flowering, drought tolerance and fruiting season. | CO3 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss about the climatic preference for pomegranate, water requirement, flowering and fruiting. | CO3 | U | 7.5 |
|  | b. | Discuss about Annona with reference to dryland cultivation. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the cultivation practices in Jamun. | CO3 | An | 7.5 |
|  | b. | Write in detail the performance of tamarind in dry and marginal lands. | CO5 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Remember the scenario of dryland horticulture in India |
| CO2 | Explain different water conservation techniques used |
| CO3 | Acquire the knowledge on different crops suitable to dryland areas |
| CO4 | Apply dryland farming techniques for various agro climatic regions |
| CO5 | Identify the suitable drought resistant crops |
| CO6 | Develop special package of practices for dryland horticultural crops |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | - | - | - | 5 | - | 11 |
| CO2 | 17 | - | - | 5 | - | - | 22 |
| CO3 | 1 | 15 | 7.5 | 12.5 | - | - | 36 |
| CO4 | 2 | 5 | - | - | 5 | - | 12 |
| CO5 | 1 | 7.5 | 7.5 | - | 5 | - | 21 |
| CO6 | 8 | 5 | 5 | - | 5 | - | 23 |
|  | | | | | | | **125** |



|  |  |  |  |
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| **Course Code** | **20AG1002** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTORY AGRO-METEOROLOGY & CLIMATE CHANCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Relative humidity is high at early morning. (True/False) | | CO3 | R | 1 |
| 2. | List the greenhouse gases. | | CO6 | A | 1 |
| 3. | is also called weather making layer in atmosphere. | | CO1 | U | 1 |
| 4. | List the different forms of precipitation? | | CO5 | R | 1 |
| 5. | Expand IPCC. | | CO4 | U | 1 |
| 6. | is a line on a map that connects places of equal barometric pressure | | CO2 | R | 1 |
| 7. | The stratosphere layer is also called\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 8. | \_\_\_\_\_\_are the imaginary lines that connect places on a map that have the same atmospheric temperature. | | CO2 | R | 1 |
| 9. | Expand HTU. | | CO5 | U | 1 |
| 10. | The \_\_\_\_\_\_is the imaginary lines joins the places having the same rainfall. | | CO1 | R | 1 |
| 11. | Expand the term IMD. | | CO2 | U | 1 |
| 12. | Give the types of weather forecasting? | | CO4 | U | 1 |
| 13. | Expand SWM. | | CO2 | U | 1 |
| 14. | and is the main crop season in Tamil Nadu and India, respectively. | | CO2 | R | 1 |
| 15. | India foodgrains production is related to all India drought (True/False) | | CO3 | U | 1 |
| 16. | to (nm) is known as visible spectrum. | | CO3 | R | 1 |
| 17. | CH4 increase is not responsible for global warming. (True/False) | | CO3 | U | 1 |
| 18. | Define temperature? | | CO3 | A | 1 |
| 19. | Give the formula for GDD. | | CO4 | U | 1 |
| 20. | Barometer is used for measuring atmospheric pressure. (True/False) | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate weather and climate. | | CO1 | U | 5 |
| 22. | Define (i) Rain and (ii) Snow | | CO4 | R | 5 |
| 23. | Discuss about northeast monsoon mechanism in India. | | CO2 | U | 5 |
| 24. | Define (i) Sea breeze and (ii) Land breeze with neat diagram. | | CO4 | A | 5 |
| 25. | Draw a diagram of the distribution of wind over the globe. | | CO5 | U | 5 |
| 26. | Discuss about different types of weather forecasting and write down their validity period. | | CO5 | A | 5 |
| 27. | Write short notes on meteorological droughts. | | CO1 | R | 5 |
| 28. | Discuss about global warming. | | CO3 | U | 5 |
| 29. | Elucidate remote sensing in the field of agriculture. | | CO6 | A | 5 |
| 30. | Define agrometeorology and explain its scope. | | CO3 | U | 5 |
| 31. | Distinguish between windbreaks and shelterbelts. | | CO3 | A | 5 |
| 32. | Explain in detail about Artificial rainmaking. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Differentiate meteorology and agricultural meteorology. | CO1 | U | 8 |
|  | b. | Write about (i) cyclone and (ii) anticyclone with the neat diagram. | CO4 | A | 7 |
|  |  |  |  |  |  |
| 34. | a. | List out the weather abnormalities and explain the flood with current incidents. | CO4 | U | 8 |
|  | b. | Draw a diagram of the distribution of atmospheric pressure over the globe. | CO1 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | Elucidate the different layers of atmosphere. | CO1 | R | 8 |
|  | b. | Climate change and its impact on agriculture. | CO6 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the significance of agricultural metrology, climate and weather |
| CO2 | Discuss the various atmospheric weather variables and its significance in crop production |
| CO3 | Understand crop weather relationships for efficient crop production |
| CO4 | Acquire knowledge on weather forecasting techniques and effect of climate change on crop  production |
| CO5 | Describe artificial rainmaking, precipitation, monsoons and its importance in Indian Agriculture |
| CO6 | Discuss global warming, and its effect on regional and national agriculture |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 22 | 14 | - | - | - | - | 36 |
| CO2 | 3 | 7 | - | - | - | - | 10 |
| CO3 | 2 | 12 | 6 | - | - | - | 20 |
| CO4 | 6 | 11 | 12 | - | - | - | 29 |
| CO5 | 1 | 11 | 5 | - | - | - | 17 |
| CO6 | - | - | 13 | - | - | - | 13 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG1003** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF GENETICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The test cross ratio of a dihybrid cross is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 2. | The condition in linked inheritance in which an individual heterozygous for two pairs of genes receives the two dominant members from one parent and the two recessives from the other parent is said to be in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase. | | CO2 | R | 1 |
| 3. | The law of inheritance was proposed by Gregor Mendel after conducting experiments on which plant? | | CO1 | An | 1 |
| 4. | What is the theory of inheritance of acquired characters? | | CO1 | R | 1 |
| 5. | The primary constricted region on each chromosome is called the \_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | An | 1 |
| 6. | The agents capable of inducing mutations are called \_\_\_\_\_\_\_\_\_\_\_. | | CO4 | R | 1 |
| 7. | A gel-like matrix lying just below the cell membrane, housing most of the cell organelles is called \_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 8. | Define ‘Penetrance’. | | CO2 | R | 1 |
| 9. | A chromosome \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a mutation that doubles part of a chromosome. | | CO4 | U | 1 |
| 10. | Alternate expression of the same gene is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | U | 1 |
| 11. | Interpret polygenes. | | CO2 | U | 1 |
| 12. | The theory of preformation believes that the organism is already preformed in the sperm or egg in a miniature form called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 13. | The power house of a cell is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 14. | What is a lethal gene? | | CO3 | R | 1 |
| 15. | Inheritance of plastids in Four ‘O’ clock plant *Mirabilis jalapa* is an example for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | U | 1 |
| 16. | An enzyme that joins fragments in normal DNA replication is \_\_\_\_\_\_\_\_\_\_. | | CO5 | R | 1 |
| 17. | The term "Genetics" was coined by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 18. | The part of the nucleotide triplet that base pairs to a specific mRNA codon is called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO5 | An | 1 |
| 19. | Strains of *Paramecium aurelia* contain kappa particles in the cytoplasm and are known as 'Killers' because they secrete toxin substance called as \_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 20. | Name the scientist who proposed the double helical structure of DNA. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Organize the stages of Meiosis with a neat diagram and its significance? | | CO1 | A | 5 |
| 22. | What is multiple allelism? Analyze the inheritance of blood groups. | | CO2 | An | 5 |
| 23. | Illustrate criss-cross inheritance with examples. | | CO2 | U | 5 |
| 24. | Classify the numerical changes in chromosomes with examples. | | CO4 | A | 5 |
| 25. | List the use of monoploid, haploid and diploid in genetics. | | CO3 | An | 5 |
| 26. | Summarize the special types of chromosomes with a neat diagram. | | CO1 | U | 5 |
| 27. | Compare “Quantitative trait” and ‘Qualitative trait”. | | CO3 | U | 5 |
| 28. | Summarize the types of RNA with suitable illustrations. | | CO5 | U | 5 |
| 29. | Construct the mechanism of linkage with suitable examples. | | CO2 | A | 5 |
| 30. | Sketch the flow of genetic information in the central dogma of life. | | CO5 | A | 5 |
| 31. | Organize the different concepts of inheritance. | | CO3 | A | 5 |
| 32. | Simplify the gene regulation in prokaryotes with suitable illustrations. | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Examine the different types of epistatic gene interactions. | CO1 | An | 8 |
|  | b. | Analyze the following in detail. i) sex influenced traits ii) sex limited traits iii) sex linked traits. | CO2 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define mutation. Examine its methods of inducing mutation and CIB technique. | CO4 | An | 8 |
|  | b. | Outline about genetic disorders with examples. | CO6 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Simplify the nature, structure and replication of the genetic material. | CO5 | An | 8 |
|  | b. | Examine cytoplasmic inheritance with examples. | CO6 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Solve problems on Mendelian genetics. |
| CO2 | Construct gene map using linkage. |
| CO3 | Identify the type of aberrations and its usage in agriculture. |
| CO4 | Understand inducing mutation by artificial methods. |
| CO5 | Explain the central dogma of life. |
| CO6 | Adopt the knowledge of cytoplasmic inheritance in plant breeding. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 6 | 5 | 9 | - | - | 23 |
| CO2 | 2 | 6 | 5 | 13 | - | - | 26 |
| CO3 | 1 | 5 | 5 | 5 | - | - | 16 |
| CO4 | 1 | 1 | 5 | 8 | - | - | 15 |
| CO5 | 2 | 5 | 5 | 9 | - | - | 21 |
| CO6 | 3 | 2 | 7 | 12 | - | - | 24 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG1005** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTION TO FORESTRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name any two fodder tree species. | | CO1 | U | 1 |
| 2. | What is the total forest cover with canopy density of \_\_\_ per cent in very dense forest? | | CO1 | R | 1 |
| 3. | List out any two fibre crops. | | CO2 | U | 1 |
| 4. | When was the Indian Forest Act passed? | | CO1 | R | 1 |
| 5. | Define moderate dense forest. | | CO1 | U | 1 |
| 6. | Who coined the term social forestry? | | CO2 | R | 1 |
| 7. | Name any two shelter tree species. | | CO3 | R | 1 |
| 8. | What is the total forest cover with canopy density of \_\_\_ in scrub forest? | | CO1 | R | 1 |
| 9. | Define carbon stock. | | CO6 | U | 1 |
| 10. | List out the any two tree species used in pulp and paper industry. | | CO2 | U | 1 |
| 11. | Name any two evergreen forest tree species. | | CO2 | R | 1 |
| 12. | When forest conservation act of ------ is amended? | | CO1 | R | 1 |
| 13. | Name any two forest research institute with location. | | CO1 | U | 1 |
| 14. | Write the botanical name of teak. | | CO2 | U | 1 |
| 15. | Name any one tree species used in pencil industry and match box industry. | | CO2 | U | 1 |
| 16. | Write the botanical name of neem. | | CO1 | U | 1 |
| 17. | Define coppice forest. | | CO4 | R | 1 |
| 18. | Define nutrient cycle. | | CO5 | R | 1 |
| 19. | What are the components under silvi-pastoral system? | | CO5 | U | 1 |
| 20. | Define moderate dense forest. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write about shelterbelt and its advantage. | | CO3 | R | 5 |
| 22. | Write any five types of forests with distribution and descriptions. | | CO4 | U | 5 |
| 23. | Write the social forestry and mention the objectives of social forestry. | | CO4 | R | 5 |
| 24. | Write a detailed note on alley cropping and write the advantages. | | CO3 | U | 5 |
| 25. | Briefly explain the shifting cultivation and write the advantages. | | CO3 | R | 5 |
| 26. | What is forest coppice? Classify the forest coppice regeneration. | | CO2 | U | 5 |
| 27. | Write a detailed note on pollarding and its advantages. | | CO3 | R | 5 |
| 28. | Differentiated between pure forest and mixed forest. | | CO3 | U | 5 |
| 29. | Write the nitrogen cycle and its advantages. | | CO5 | R | 5 |
| 30. | Detailed note on multitier cropping, mixed cropping system and advantages. | | CO4 | U | 5 |
| 31. | Define silvics and silviculture? Write the objectives of silviculture. | | CO3 | R | 5 |
| 32. | Write salient feature of national forest policy 1988 and the management. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write a detailed note on agroforestry system and practices under components. | CO4 | E | 7.5 |
|  | b. | Give a detailed note on forest natural regeneration and write the external factors. | CO1 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the major groups of forest and write any three types of tropical and montane forest. | CO2 | E | 7.5 |
|  | b. | Detailed note on artificial regeneration? Write the objectives and management strategies. | CO2 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Give a detailed note on multipurpose tree species in agroforestry. | CO4 | E | 7.5 |
|  | b. | Write a detailed note on carbon sequestration and climate change. | CO6 | E | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the forest eco system and forest regeneration. |
| CO2 | Remember the concepts of agroforestry practiced in various agro ecosystems |
| CO3 | Apply the knowledge for developing agro forestry, wind breaks, shelter belts, silviculture and social forestry |
| CO4 | Recall the multipurpose trees in agroforestry systems |
| CO5 | Analyze the impact of nitrogen fixation, carbon sequestration and develop strategies for climate mitigation |
| CO6 | Explain the beneficial effects of agro forestry in relation to nitrogen fixation, soil conservation, litter dynamics and nutrient cycles |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 11.5 | 4 | - | - | - | - | 15.50 |
| CO2 | 15.5 | 9 | - | - | 7.5 | - | 32 |
| CO3 | 21 | 10 | - | - | - | - | 31 |
| CO4 | 5 | 11 | - | - | 15 | - | 31 |
| CO5 | 6 | 1 | - | - | 7.5 | - | 14.50 |
| CO6 | - | 1 | - | - | - | - | 1 |
|  | | | | | | | **125** |



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| **Course Code** | **20AG1007** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF ENTOMOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define: Moulting. | | CO1 | R | 1 |
| 2. | The major protein present in the insect cuticle is…………………. | | CO1 | U | 1 |
| 3. | Indian museum is located at ……………….. | | CO1 | R | 1 |
| 4. | Crustaceans respire through………………. | | CO1 | U | 1 |
| 5. | Give an example for hypognathous type of head. | | CO1 | R | 1 |
| 6. | Name the wing that is suitable for the flight in insects. | | CO1 | U | 1 |
| 7. | Inverted Y shaped suture present on the insect head is called……………….. | | CO1 | R | 1 |
| 8. | Central insecticide act enacted during the year…………….. | | CO4 | R | 1 |
| 9. | Honeybees are classified under the order……………… | | CO5 | R | 1 |
| 10. | Dragonflies undergo ………………. type of metamorphism. | | CO1 | U | 1 |
| 11. | The largest and strongest part of leg segment is………………………. | | CO1 | R | 1 |
| 12. | The pinning region for the true bugs ……………………. | | CO5 | U | 1 |
| 13. | Insect body cavity is known as……………………… | | CO2 | R | 1 |
| 14. | The pupa of butterfly……………………………….. | | CO1 | R | 1 |
| 15. | The major excretory organ present in insects are …………………… | | CO2 | R | 1 |
| 16. | The egg laying organ in insects……………………………… | | CO2 | U | 1 |
| 17. | True flies are belong to the order………………….. | | CO5 | R | 1 |
| 18. | The mutual exchange of food between the members of social insect colony is called as …………….. | | CO2 | U | 1 |
| 19. | Type of leg present in cockroach are …………………. | | CO1 | R | 1 |
| 20. | The finest tracheal branches are called…………………………. | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Enumerate the type of antenna with example. | | CO1 | U | 5 |
| 22. | List the characters of the class Insecta. | | CO1 | R | 5 |
| 23. | Explain the wing coupling mechanism in insects with example. | | CO1 | U | 5 |
| 24. | Explain the steps involved in moulting. | | CO1 | U | 5 |
| 25. | Write the functions of saliva in insects. | | CO2 | An | 5 |
| 26. | List the organs of excretory system. | | CO2 | U | 5 |
| 27. | Classify the pests based on occurrence. | | CO3 | An | 5 |
| 28. | Explain the practices of IPM. | | CO4 | A | 5 |
| 29. | Differentiate Exopterygota and Endoterygota. | | CO5 | U | 5 |
| 30. | Draw a neat sketch of respiratory system and label the parts. | | CO5 | U | 5 |
| 31. | Highlight the characters of Orthoptera. | | CO5 | R | 5 |
| 32. | Differentiate Anisoptera and Zygoptera. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Brief on the reasons of dominance of insects in the animal kingdom. | CO1 | An | 7 |
|  | b. | Illustrate the basic structure of leg and explain the different types of legs with example. | CO1 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Illustrate the structure and functions of digestive system. | CO2 | U | 8 |
|  | b. | Explain the structure and function of circulatory system in insects. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the general characters of order Lepidoptera and list FOUR important families in the order. | CO5 | U | 8 |
|  | b. | Discuss the general characters of order Coleoptera and list FOUR important families in the order. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the insect external body parts and their modifications |
| CO2 | Acquire knowledge on structure of various organ systems and their functions |
| CO3 | Analyze the factors influencing pest occurrence |
| CO4 | Understand the concept of different pest management techniques |
| CO5 | Develop knowledge on different orders and families of agriculturally important pests |
| CO6 | Analyze the pest management strategies |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 12 | 27 | - | 7 | - | - | 46 |
| CO2 | 2 | 23 | - | 5 | - | - | 30 |
| CO3 | - | - | - | 5 | - | - | 5 |
| CO4 | 1 |  | 5 | - | - | - | 6 |
| CO5 | 7 | 31 | - | - | - | - | 38 |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



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| **Course Code** | **20AG1008** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL MICROBIOLOGY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Reproduction in bacteria is by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 2. | The term autotroph means | | CO1 | R | 1 |
| 3. | List two major contributions of Robert Koch. | | CO1 | An | 1 |
| 4. | Irregular, non-motile cells of rhizobia in the nodules of legume are called | | CO6 | A | 1 |
| 5. | Find the role of Rec A protein in genetic recombination. | | CO5 | E | 1 |
| 6. | Nigrosin is used for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ staining. | | CO2 | R | 1 |
| 7. | The inflammable component of biogas is | | CO6 | U | 1 |
| 8. | The portion of the growth curve where rapid growth of bacteria is observed is known as……………. | | CO4 | An | 1 |
| 9. | What is peritrichous flagella? | | CO1 | R | 1 |
| 10. | Why the plasmid is called a vector? | | CO5 | U | 1 |
| 11. | Give two examples of Entamopathogenic fungi. | | CO6 | R | 1 |
| 12. | Differentiate autochthonous and allochthonous bacteria. | | CO1 | U | 1 |
| 13. | Preservation of microbes by freeze drying method is called as\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | U | 1 |
| 14. | Relate synergism and antibiosis. | | CO3 | E | 1 |
| 15. | Give an associative symbiotic bacteria. | | CO6 | R | 1 |
| 16. | Name the symbiont of Azolla. | | CO6 | R | 1 |
| 17. | The function of ligase is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | A | 1 |
| 18. | Give an example for microbial biocontrol agent. | | CO6 | R | 1 |
| 19. | Mention the name of organisms and enzymes involved in cellulose decomposition. | | CO3 | E | 1 |
| 20. | Are all bacteria spore forming? Give an example. | | CO1 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate Gram positive and Gram negative bacteria. | | CO1 | E | 5 |
| 22. | Write short notes on contributions of Louis Pasteur. | | CO1 | R | 5 |
| 23. | Discuss briefly about the factors influencing the activities of soil microorganisms. | | CO4 | U | 5 |
| 24. | Interpret the mechanism of biological nitrogen fixation. | | CO4 | A | 5 |
| 25. | Explain the types of flagella with diagrams. Give examples. | | CO2 | An | 5 |
| 26. | What are the advantages and disadvantages of biofertilizers over chemical fertilizers? | | CO6 | U | 5 |
| 27. | Illustrate the growth phases of bacteria with diagram. | | CO2 | R | 5 |
| 28. | Explain the purification methods for bacteria and fungi. | | CO3 | E | 5 |
| 29. | Describe the process of legume – *Rhizobium* symbiosis. | | CO4 | C | 5 |
| 30. | Write a short account on the phosphate solubilization by microorganism. | | CO3 | A | 5 |
| 31. | Explain the mass production of BGA. | | CO6 | A | 5 |
| 32. | Explain the process of silage making. | | CO6 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain various modes of nutrition found in bacteria. | CO2 | U | 8 |
|  | b. | Compare and contrast prokaryotic and eukaryotic cell. | CO1 | R | 7 |
| 34. | a. | Summarize the different types of biofertilizers with examples. | CO6 | E | 8 |
|  | b. | Explain the sulphur cycle. | CO4 | U | 7 |
| 35. | a. | Discuss different mechanisms of genetic recombination in bacteria with suitable diagrams. | CO5 | An | 8 |
|  | b. | Briefly explain the necessary of biological nitrogen fixation process in plants. | CO4 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
|  | On completion of this course, students will be able to |
| CO1 | Comprehend the importance and role of microbes in agricultural production |
| CO2 | Understand principles of microscopy, sterilization techniques and nutrient media preparation |
| CO3 | Enumerate microbial load in soil and perform isolation, culturing and purification of microbes |
| CO4 | Explain the role of microbes in enhancing soil fertility |
| CO5 | Employ genetic transformation methods using microbes in crop improvement |
| CO6 | Explore and develop biofertilizers, biopesticides and biofuels |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 14 | 2 | - | 2 | 5 | - | 23 |
| CO2 | 6 | 9 | - | 5 | - | - | 20 |
| CO3 | - | - | 5 | - | 7 | - | 12 |
| CO4 | - | 12 | 12 | 1 | - | 5 | 30 |
| CO5 | - | 1 | 1 | 8 | 1 | - | 11 |
| CO6 | 4 | 6 | 6 | - | 13 | - | 29 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG1010** | **Duration** | **3hrs** |
| **Course Name** | **HUMAN VALUES AND ETHICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is motivation? | | CO1 | U | 1 |
| 2. | Define philosophy. | | CO2 | R | 1 |
| 3. | Relate morals and ethics. | | CO1 | An | 1 |
| 4. | What are the four temperament analyses? | | CO4 | A | 1 |
| 5. | Perseverance is often regarded a key to ………….. | | CO5 | U | 1 |
| 6. | What is an example of intuition? | | CO6 | U | 1 |
| 7. | Knowing yourself is the beginning of ……………. | | CO1 | U | 1 |
| 8. | SWOT stands for……………… | | CO2 | R | 1 |
| 9. | Imposed purpose is your true purpose. True / False | | CO2 | A | 1 |
| 10. | What would you regret not fully doing or having in your life? | | CO5 | U | 1 |
| 11. | Write two benefits of goal setting. | | CO5 | R | 1 |
| 12. | What are decision making skills? | | CO3 | An | 1 |
| 13. | Contentment brings pain and negativity – True / False. | | CO4 | E | 1 |
| 14. | Give two ways to express gratitude. | | CO3 | U | 1 |
| 15. | The process of making ethical decisions requires commitment and competency. True / False. | | CO4 | E | 1 |
| 16. | Characters of choleric temperament are………… | | CO4 | An | 1 |
| 17. | Gratitude improves ……………and increases…………….. | | CO3 | R | 1 |
| 18. | Negative emotions arise when we are not in balance. True / False | | CO4 | U | 1 |
| 19. | ……………....is the emotional state of satisfaction. | | CO4 | U | 1 |
| 20. | Natural acceptance depends on our beliefs or past conditionings. True / False | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Why do we need a balance between body and mind? | | CO1 | E | 5 |
| 22. | Summarize the content and process of self-exploration. | | CO2 | An | 5 |
| 23. | Elaborate the importance of living in harmony with others and surroundings. | | CO2 | R | 5 |
| 24. | Determine the factors that lead to poor decision making. | | CO6 | An | 5 |
| 25. | What are the important values one should possess for a successful life? | | CO1 | U | 5 |
| 26. | Identify the key elements that make up motivation. | | CO3 | U | 5 |
| 27. | Analyze the key benefits leaders derive from good decision making skills. | | CO6 | U | 5 |
| 28. | Differentiate the choleric and melancholic temperament. | | CO4 | An | 5 |
| 29. | What is emotional detachment and why you need it? | | CO4 | E | 5 |
| 30. | Describe the most difficult decision that you had to make and why was it so difficult? | | CO3 | An | 5 |
| 31. | Compare and contrast real and imposed purpose. | | CO2 | E | 5 |
| 32. | Differentiate ethical and effective decisions. | | CO3 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Elucidate the strategies to develop a positive spirit within yourself. | CO2 | An | 8 |
|  | b. | Values are positive guiding principles of life. Explain. | CO1 | U | 7 |
| 34. | a. | Discuss the types of goals and benefits of goal setting. | CO5 | A | 8 |
|  | b. | Explore the importance of contentment in personal life. | CO5 | U | 7 |
| 35. | a. | Explain the ethical values that help you build your character in yourself and others. | CO3 | E | 8 |
|  | b. | Discover the steps for effective decision making. | CO5 | E | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
|  | On completion of this course, students will be able to |
| CO1 | Escalate the quality of their life and careers |
| CO2 | Gain deeper understanding about the purpose of their life |
| CO3 | Become value based professionals |
| CO4 | Lead a balanced life with emotional stability |
| CO5 | Set realistic goals in life and start working towards them. |
| CO6 | Become leaders with social concern |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | 15 | - | 1 | 5 | - | 22 |
| CO2 | 6 | - | 1 | 13 | 5 | - | 25 |
| CO3 | 1 | 6 | 5 | 6 | 8 | - | 26 |
| CO4 | - | 2 | 1 | 6 | 7 | - | 16 |
| CO5 | 1 | 9 | 8 |  | 7 | - | 25 |
| CO6 | - | 6 | - | 5 | - | - | 11 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG1010** | **Duration** | **3hrs** |
| **Course Name** | **HUMAN VALUES AND ETHICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Relate Values and Ethics. | | CO1 | U | 1 |
| 2. | Define professional ethics. | | CO3 | R | 1 |
| 3. | Good decisions are both …………..and …………………. | | CO2 | U | 1 |
| 4. | SMART goals stands for…………. | | CO5 | R | 1 |
| 5. | What is the vision statement of our institute? | | CO2 | A | 1 |
| 6. | Identify your purpose and principle in life. | | CO1 | U | 1 |
| 7. | Outline emotional intelligence. | | CO4 | U | 1 |
| 8. | ………………is the expression of appreciation for what one has. | | CO1 | E | 1 |
| 9. | What are your most cherished personal values? | | CO1 | U | 1 |
| 10. | Each person has their own unique combination of personality or temperament traits. True / False. | | CO4 | An | 1 |
| 11. | What are the three types of services? | | CO6 | R | 1 |
| 12. | List two strategies to develop a positive spirit within yourself. | | CO5 | U | 1 |
| 13. | Developing our ability through hard work and effort is called as …………mindset. | | CO2 | An | 1 |
| 14. | Contentment promotes …………….. | | CO3 | E | 1 |
| 15. | Relate prosperity and wealth. | | CO2 | A | 1 |
| 16. | Differentiate intrinsic and extrinsic motivators. | | CO5 | U | 1 |
| 17. | ……………………..is the mental and emotional attitude that focusses on the bright side of life. | | CO4 | U | 1 |
| 18. | What is selfless service? | | CO6 | U | 1 |
| 19. | The soul is able to establish a connection with the Creator and gain true happiness in life. True / False. | | CO6 | R | 1 |
| 20. | If you believe you can, you will …………….. | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Summarize the core life values and its importance. | | CO1 | U | 5 |
| 22. | Describe the different types of temperaments. | | CO4 | A | 5 |
| 23. | Suggest your ways to maintain a healthy lifestyle. | | CO2 | An | 5 |
| 24. | Define self-exploration. What is the content of self-exploration? | | CO2 | E | 5 |
| 25. | Identify the key characteristics of well-crafted vision statements. | | CO3 | U | 5 |
| 26. | Compare and contrast personal and professional values. | | CO3 | E | 5 |
| 27. | Explain the powerful ways to care for your soul. | | CO6 | U | 5 |
| 28. | Differentiate negative self-talk and positive thinking. | | CO3 | A | 5 |
| 29. | How does value education helps in fulfilling one’s aspirations? | | CO1 | An | 5 |
| 30. | Illustrate the ways to turn obstacles to opportunities. | | CO5 | U | 5 |
| 31. | Distinguish between the needs of self and body. | | CO6 | An | 5 |
| 32. | What were some challenges, difficulties and hardships you have overcome or are in the process of overcoming? How did you do it? | | CO5 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Elaborate the need of important principles to attain success in life | CO2 | U | 8 |
|  | b. | Both values and skills are required for success in any human endeavor. Explain | CO1 | A | 7 |
| 34. | a. | Discuss the inspiring personal mission statements of famous people | CO3 | R | 8 |
|  | b. | Evaluate the meaning of success in life. How can you attain it? | CO5 | U | 7 |
| 35. | a. | Natural acceptance is innate, invariant and universal. Explain this statement with an example. | CO4 | U | 8 |
|  | b. | Write a short note on the need of value education in today’s scenario | CO1 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
|  | On completion of this course, students will be able to |
| CO1 | Escalate the quality of their life and careers |
| CO2 | Gain deeper understanding about the purpose of their life |
| CO3 | Become value based professionals |
| CO4 | Lead a balanced life with emotional stability |
| CO5 | Set realistic goals in life and start working towards them. |
| CO6 | Become leaders with social concern |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 8 | 7 | 12 | 1 |  | 28 |
| CO2 | - | 10 | 2 | 6 | 5 |  | 23 |
| CO3 | 9 | 5 | 5 | - | 6 |  | 25 |
| CO4 | - | 10 | 5 | 1 | - |  | 16 |
| CO5 | 1 | 14 | - | - | 5 |  | 20 |
| CO6 | 2 | 6 | - | 5 | - |  | 13 |
|  | | | | | | | **125** |



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| **Course Code** | **20AG2003** | **Duration** | **3hrs** |
| **Course Name** | **ENTREPRENEURSHIP DEVELOPMENT AND**  **BUSINESS COMMUNICATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | |
| 1. | What is “Bootstrapping? | | | CO1 | R | 1 |
| 2. | What is SLR? | | | CO1 | R | 1 |
| 3. | SIPCOT: Expand | | | CO1 | R | 1 |
| 4. | Define Repo rate. | | | CO4 | R | 1 |
| 5. | What is monitoring? | | | CO3 | R | 1 |
| 6. | Name the type of entrepreneur who is timid and cautious. | | | CO2 | R | 1 |
| 7. | CRR: Expand. | | | CO4 | R | 1 |
| 8. | “Locus of Control”: What it means to an entrepreneur? | | | CO1 | R | 1 |
| 9. | What is EXIM Policy? | | | CO4 | R | 1 |
| 10. | The word “Entrepreneur” is derived from the ………………word | | | CO4 | R | 1 |
| 11. | Name any two Entrepreneurship Development Institute? | | | CO3 | R | 1 |
| 12. | What is MFI? | | | CO3 | R | 1 |
| 13. | What is Seed Capital? | | | CO3 | R | 1 |
| 14. | Write the full form of TQM. | | | CO6 | R | 1 |
| 15. | Expand SIDO. | | | CO6 | R | 1 |
| 16. | Mention the four roles played by entrepreneurship development process to help an individual become an entrepreneur? | | | CO1 | R | 1 |
| 17. | Intrinsic vs Extrinsic motivation: Comment. | | | CO6 | U | 1 |
| 18. | Name the function which is basic for all other management functions. | | | CO1 | U | 1 |
| 19. | Name an industry for which Industrial Licensing was not relaxed in New Economic Policy in 1991. | | | CO2 | U | 1 |
| 20. | Expand NISIET. | | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | |
| 21. | Discuss the characteristics of Entrepreneurs. | | | CO1 | Cr | 5 |
| 22. | Outline achievement Motivation. | | | CO1 | U | 5 |
| 23. | Write short notes on “Mudra” Loan Scheme. | | | CO4 | R | 5 |
| 24. | Discuss on “Make in India” initiative in our country. | | | CO2 | Cr | 5 |
| 25. | Illustrate and explain the Entrepreneurial Process. | | | CO3 | U | 5 |
| 26. | Describe three Phases of EDP – Pre-Training, Training and Post-Training. | | | CO3 | R | 5 |
| 27. | What are the scope and importance of Agricultural Supply Chain? | | | CO6 | R | 5 |
| 28. | Write the functions of Small Industries Development Organization (SIDO). | | | CO1 | U | 5 |
| 29. | Write about the project planning. | | | CO6 | R | 5 |
| 30. | What is SWOT analysis? Explain with an example. | | | CO5 | U | 5 |
| 31. | Explain basics Managerial Skills of an enterprise. | | | CO4 | E | 5 |
| 32. | Distinguish between an entrepreneur and a business man. | | | CO1 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | |
| 33. | | a. | What is Agripreneurship? Elaborate the need and scope of it. Explain the broad business activities that are covered under Agripreneurship. | CO1 | C | 8 |
|  | | b. | Elaborate different types of Motivation. | CO4 | U | 7 |
| 34. | | a. | Describe in detail POSDCoRB functions of Management. | CO2 | U | 8 |
|  | | b. | Explain various types of entrepreneurs based on the classification by Clarence Danhof, Arthur H. Cole, Ownership and Scale of enterprise. | CO5 | A | 7 |
| 35. | | a. | Explain on how to write a project report. | CO3 | U | 8 |
|  | | b. | Discus on Total Quality Management (TQM). | C06 | C | 7 |

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|  | **COURSE OUTCOMES** |
| CO1 | Distinguish different entrepreneurial traits and skills. |
| CO2 | Know the agribusiness opportunities open for agriculture graduates |
| CO3 | Apply the leadership skills to get financial support for start-ups |
| CO4 | Understand the impact of economic reforms in agri-business |
| CO5 | Perform SWOT analysis of an entity for any prospective agribusiness/ideas |
| CO6 | Formulate business proposal for successful implementation of the business plan |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 5 | 11 |  | 5 |  | 13 | 34 |
| CO2 | 1 | 10 |  |  |  | 5 | 16 |
| CO3 | 9 | 13 |  |  |  |  | 22 |
| CO4 | 9 | 7 |  |  | 5 |  | 21 |
| CO5 |  | 5 | 7 |  |  |  | 12 |
| CO6 | 12 | 1 |  |  |  | 7 | 20 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG2007** | **Duration** | **3hrs** |
| **Course Name** | **GEOINFORMATICS AND NANO-TECHNOLOGY AND PRECISION FARMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | \_\_\_\_\_\_\_\_\_\_ is a modern farming management concept using digital techniques to monitor and optimise agricultural production processes. | | CO1 | R | 1 |
| 2. | \_\_\_\_\_\_\_\_ is the acquisition of information about a phenomenon or a physical object without making any real contact, typically from aircraft or satellites. | | CO3 | R | 1 |
| 3. | Name the sensor which is used to measure the soil compaction or the mechanical resistance of the soil. | | CO3 | An | 1 |
| 4. | \_\_\_\_\_\_\_\_\_ is a global navigation satellite system owned and operated by the Russia with 24+ satellites. | | CO1 | R | 1 |
| 5. | What is BeiDou Navigation Satellite System (BDS)? | | CO3 | U | 1 |
| 6. | What is a drone? | | CO2 | U | 1 |
| 7. | \_\_\_\_\_\_\_\_\_is a general term describing any satellite constellation that provides positioning, navigation, and timing (PNT) services on a global or regional basis. | | CO1 | R | 1 |
| 8. | What is a micro drone? | | CO2 | R | 1 |
| 9. | What is the expansion for STCR? | | CO5 | U | 1 |
| 10. | \_\_\_\_\_\_\_\_\_\_ is a branch of geoinformatics focusing on the study of acquisition, processing, management, and applications of agro-geoinformation. | | CO3 | An | 1 |
| 11. | The remote sensing system that depends on solar energy radiation for sensing the targets is known as \_\_\_\_\_\_\_\_ remote sensing. | | CO3 | A | 1 |
| 12. | \_\_\_\_\_\_\_\_ are computer programmes that mimic the growth and development of crops. | | CO4 | R | 1 |
| 13. | A \_\_\_\_\_\_\_\_\_\_model is one that makes definite predictions for quantities (e.g. crop yield or rainfall) without any associated probability distribution, variance, or random element. | | CO4 | U | 1 |
| 14. | What is the expansion for DSSAT? | | CO4 | R | 1 |
| 15. | \_\_\_\_\_\_\_\_\_ is the term given to those areas of science and engineering where phenomena that take place at dimensions in the nanometre scale are utilised in the design, characterisation, production and application of materials, structures, devices and systems. | | CO6 | R | 1 |
| 16. | Particle with one or more dimensions at the nanoscale are called as \_\_\_\_\_\_\_\_\_\_\_. | | CO6 | U | 1 |
| 17. | \_\_\_\_\_\_\_ is a method of breaking a field into smaller grids and taking the soil sample from each grid for soil testing. | | CO1 | R | 1 |
| 18. | Name the technology which allows fertilizers, irrigation water and other farm inputs to be applied at different rates across a field, without manually changing the rate settings on equipment or having to make multiple passes over an area. | | CO1 | A | 1 |
| 19. | The maximum speed limit for flying an agriculture drone is \_\_\_\_ meters /sec. | | CO2 | R | 1 |
| 20. | \_\_\_\_\_\_\_\_\_ is the science of accurately measuring and understanding the three fundamental properties of earth: its geometric shape, its orientation in space, and its gravity field, as well as the changes of these properties with time. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | What are the objectives of precision agriculture? | | CO1 | U | 5 |
| 22. | Write in detail about the regulations on pesticide spraying for crop protection by using drones. | | CO2 | R | 5 |
| 23. | Brief about the green, yellow, and red zones as deployedbythe Indian ministry of civil aviation for flying a drone. | | CO2 | A | 5 |
| 24. | Write a brief note on cartography. | | CO3 | R | 5 |
| 25. | Elaborate about photogrammetry and its application in agriculture. | | CO3 | R | 5 |
| 26. | Write a short note on web mapping or online mapping. | | CO3 | U | 5 |
| 27. | What are the advantages of remote-sensing technology over the traditional methods in agricultural resources survey? | | CO3 | An | 5 |
| 28. | List down the limitations of crop modeling. | | CO4 | U | 5 |
| 29. | Write about the leaf colour chart. | | CO5 | R | 5 |
| 30. | List down the challenges of using sensors in agriculture. | | CO3 | An | 5 |
| 31. | Explain about nanobiofertilizers. | | CO6 | R | 5 |
| 32. | What are the challenges in using agricultural drones in India? | | CO2 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write in detail about the history and the need for precision farming. | CO1 | U | 7.5 |
|  | b. | Write in detail about the application of drones in agriculture. | CO2 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Describe in detail about the different types of agriculture sensors. | CO3 | R | 7.5 |
|  | b. | Write elaborately on the regulations for owning and operating drones in India. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Elaborate the application of remote sensing in agriculture | CO3 | A | 7.5 |
|  | b. | Write an essay on the uses of sensors in precision agriculture | CO1 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the concepts of precision farming. |
| CO2 | Demonstrate the use of Unmanned Aerial Vehicle (UAV) in farm operations. |
| CO3 | Enhance their understanding on Geoinformatic principles and the use of GIS, GPS, Sensors and Remote Sensing technologies in agriculture. |
| CO4 | Relate the use of various Crop Simulation Models in crop production. |
| CO5 | Apply the STCR approach for optimizing the fertilizer inputs in precision farming. |
| CO6 | Acquire knowledge on nanotechnology and its uses for scaling-up farm productivity |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 12.5 | 8.5 |  |  |  | 25 |
| CO2 | 14.5 | 8.5 | 5 | 5 |  |  | 33 |
| CO3 | 19.5 | 6 | 8.5 | 12 |  |  | 46 |
| CO4 | 2 | 6 |  |  |  |  | 8 |
| CO5 | 5 | 1 |  |  |  |  | 6 |
| CO6 | 6 | 1 |  |  |  |  | 7 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG2008** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF PLANT BREEDING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define heritability. | | CO1 | U | 1 |
| 2. | What is male sterility? Give examples. | | CO1 | U | 1 |
| 3. | Define pure line. Who gave the concept of the Pure line? | | CO1 | R | 1 |
| 4. | Differentiate autogamy and allogamy. | | CO1 | U | 1 |
| 5. | What is Fairchild’s mule? | | CO1 | R | 1 |
| 6. | What is polyploidy? List out the types of polyploidy. | | CO3 | U | 1 |
| 7. | What are the sources of dwarfing genes in rice and wheat? | | CO1 | A | 1 |
| 8. | What is three-line breeding? | | CO1 | A | 1 |
| 9. | NBPGR stands for -------------------- and is located at-------------------- | | CO2 | R | 1 |
| 10. | Differentiate protandry and protogyny. | | CO1 | A | 1 |
| 11. | Differentiate backcross and testcross. | | CO2 | U | 1 |
| 12. | Define Hardy-Weinberg law. | | CO2 | R | 1 |
| 13. | Define selection differential. | | CO1 | U | 1 |
| 14. | What is a spontaneous mutation? Give example. | | CO3 | U | 1 |
| 15. | Mutations are always recessive and recessive mutants are identified in the M2 generation (True/False). | | CO3 | A | 1 |
| 16. | Expand GCA and SCA. | | CO3 | U | 1 |
| 17. | What is multiline variety? Give examples. | | CO3 | A | 1 |
| 18. | What is transgenic male sterility? | | CO3 | U | 1 |
| 19. | The sum total of all alleles of various genes present in a crop species and its  wild relatives are called ----------------------. | | CO2 | U | 1 |
| 20. | What are farmer’s rights? | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate male sterility and self-incompatibility. | | CO1 | A | 5 |
| 22. | Explain the components of variation. | | CO2 | U | 5 |
| 23. | Explain the objectives of plant breeding. | | CO1 | R | 5 |
| 24. | Explain the mechanisms promoting cross-pollination. | | CO1 | U | 5 |
| 25. | What are the undesirable effects of plant breeding? | | CO1 | R | 5 |
| 26. | Write any five famous plant breeders and their contributions. | | CO1 | A | 5 |
| 27. | Explain the breeding methods followed in asexually propagated crops. | | CO3 | U | 5 |
| 28. | What is Plant introduction? What are the plant introduction agencies in India? | | CO3 | U | 5 |
| 29. | Differentiate pure line selection and mass selection. | | CO3 | An | 5 |
| 30. | Explain the barriers to the production of distant hybrids. | | CO3 | U | 5 |
| 31. | Define inbreeding depression and explain the degrees of inbreeding depression. | | CO2 | U | 5 |
| 32. | Explain the hypothesis of the genetic basis of heterosis. | | CO4 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define apomixis and explain the types of apomixis with examples. | CO1 | U | 8 |
|  | b. | What is cytoplasmic genetic male sterility? Explain the three-line breeding system for hybrid seed production. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the classification of self-incompatibility with examples. | CO1 | R | 8 |
|  | b. | Explain the methods to eliminate self-incompatibility in plants. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | What is backcross? Explain the method of transferring the dominant gene by backcross breeding with a neat diagram. | CO3 | U | 8 |
|  | b. | What are Intellectual Property Rights (IPR)? Explain with suitable examples. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the basic concepts of plant breeding and genetics. |
| CO2 | Remember the Origin and diversity of different crops, components of inheritance, and variations |
| CO3 | Apply the knowledge to develop high-yielding crops with better quality |
| CO4 | Produce varieties and hybrids with Host Plant Resistance |
| CO5 | Apply the protocols of Intellectual Property Rights and Patenting practically. |
| CO6 | Analyze Plant Breeders and & Farmer’s Rights for research and commercial seed production of high-yielding crops |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 24 | 13 | - | - | - | 57 |
| CO2 | 2 | 12 | - | - | - | - | 14 |
| CO3 | - | 22 | 7 | 5 | - | - | 34 |
| CO4 | - | 12 | - | - | - | - | 12 |
| CO5 | - | 7 | - | - | - | - | 7 |
| CO6 | 1 | - | - | - | - | - | 1 |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20AG2010** | **Duration** | **3hrs** |
| **Course Name** | **PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Recall any two varieties of Rose used for cut flower production. | | CO1 | R | 1 |
| 2. | Define landscaping. | | CO2 | R | 1 |
| 3. | Name any two flowering climbers. | | CO3 | R | 1 |
| 4. | State the commercial propagation method in Carnation. | | CO1 | R | 1 |
| 5. | Identify the major constituents present in lemon grass. | | CO5 | R | 1 |
| 6. | State the commercial propagation method in Jasmine. | | CO1 | R | 1 |
| 7. | Write the botanical name of Gerbera. | | CO1 | A | 1 |
| 8. | Define bud capping. Mention the crop where bud capping is followed. | | CO1 | R | 1 |
| 9. | List any two types of mint and write their botanical names. | | CO1 | R | 1 |
| 10. | List any two lawn grasses suitable for tropical regions. | | CO2 | R | 1 |
| 11. | Give two examples of flowering trees used in landscaping. | | CO3 | U | 1 |
| 12. | Define free style garden. | | CO4 | R | 1 |
| 13. | Define shrubbery. | | CO3 | R | 1 |
| 14. | Pankhuri and gulkand are value added products of\_\_\_\_\_\_\_\_\_\_flower crop. | | CO5 | R | 1 |
| 15. | List two types of marigold used in landscaping. | | CO3 | R | 1 |
| 16. | List any two medicinal crops used for cold and cough. | | CO5 | R | 1 |
| 17. | Floriculture research station is located at \_\_\_\_\_\_\_\_\_\_\_\_in Tamil Nadu. | | CO1 | R | 1 |
| 18. | Define topiary. | | CO6 | R | 1 |
| 19. | Define mowing. | | CO2 | R | 1 |
| 20. | Identify two methods used for essential oil extraction in flower crops. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List any five aromatic crops with their botanical names, economic parts, and major constituents present in them. | | CO5 | R | 5 |
| 22. | Write about the pruning method followed in three commercially important species of Jasmine. | | CO6 | A | 5 |
| 23. | Discuss the netting and pinching practices followed in Carnation. | | CO1 | U | 5 |
| 24. | Discuss Vetiver in the following aspects: climate, soil, spacing, propagation, and harvest. | | CO1 | U | 5 |
| 25. | Differentiate between sympodial and monopodial orchids with examples. | | CO1 | An | 5 |
| 26. | Classify roses with their characters and give examples for each category. | | CO1 | An | 5 |
| 27. | Summarize the different value added products prepared from loose flowers. | | CO5 | E | 5 |
| 28. | Differentiate between Asiatic and Oriental type Lilium with examples. | | CO1 | An | 5 |
| 29. | Describe the wild style garden. | | CO4 | R | 5 |
| 30. | Write about the features of shrubs used in landscaping. | | CO3 | C | 5 |
| 31. | Explain the uses of trees in landscaping. | | CO3 | U | 5 |
| 32. | Discuss Citronella in the following aspects: climate, soil, spacing, propagation and harvest. | | CO1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Summarize the scope and importance of ornamental, medicinal and aromatic crops. | CO1 | E | 7.5 |
|  | b. | Illustrate the principles of landscaping. | CO3 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Classify ornamental crops and give suitable examples for each category. | CO3 | An | 7.5 |
|  | b. | Prepare a layout of formal and informal style gardens, explain the principles followed and give two examples for each category. | CO4 | C | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the harvesting and processing techniques for the following crops: Ashwagandha, Aloe and Isabgol. | CO5 | U | 7.5 |
|  | b. | Discuss the production technology of Rose under protected cultivation method. | CO1 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Apply production technology of cut flowers, MAP and ornamental crops |
| CO2 | Establish lawns and manage turf |
| CO3 | Apply principles of landscaping using trees, shrubs and climbers |
| CO4 | Design different styles of gardens |
| CO5 | Handle flower crop harvesting and post-harvest operation and processing of MAPs |
| CO6 | Perform training and pruning of ornamental plants |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 22.5 | 1 | 15 | 7.5 | - | 52.0 |
| CO2 | 3 | - | - | - | - | - | 3.0 |
| CO3 | 3 | 6 | - | 15 | - | 5 | 29.0 |
| CO4 | 6 | - | - | - | - | 7.5 | 13.5 |
| CO5 | 9 | 7.5 | - | - | 5 | - | 21.5 |
| CO6 | 1 | - | 5 | - | - | - | 6.0 |
|  | | | | | | | **125** |



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| **Course Code** | **20AG2013** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF SEED TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The protective cover for the young root tip is ----------- | | CO1 | R | 1 |
| 2. | Farmer's right is protected under ----------act. | | CO5 | R | 1 |
| 3. | List the laboratory test for assessing transgene contamination. | | CO2 | U | 1 |
| 4. | In dicots, food is stored in the ------------ | | CO4 | U | 1 |
| 5. | What is a tetrazolium test? | | CO5 | U | 1 |
| 6. | List the importance of seed treatment. | | CO5 | U | 1 |
| 7. | Ploidy level of endosperm is ---- | | CO4 | R | 1 |
| 8. | List the supplementary pollination methods in rice. | | CO3 | U | 1 |
| 9. | What are objectionable weed seeds? Give example. | | CO2 | U | 1 |
| 10. | List the critical crop growth stages during field inspection. | | CO5 | R | 1 |
| 11. | How genetic purity test can be performed in seed production? | | CO3 | R | 1 |
| 12. | Name the designated diseases of sorghum. | | CO1 | U | 1 |
| 13. | State the important minerals for pod formation in groundnut. | | CO4 | A | 1 |
| 14. | What are the different methods followed in seed testing? | | CO6 | R | 1 |
| 15. | What is barrier isolation? | | CO2 | R | 1 |
| 16. | Write a brief note on the role of NSC in Indian seed industry. | | CO2 | U | 1 |
| 17. | Expand ISTA. | | CO5 | R | 1 |
| 18. | What is the color of breeder’s seed tag and certified seed tag? | | CO2 | R | 1 |
| 19. | Differentiate physiological maturity and harvestable maturity. Give example. | | CO3 | U | 1 |
| 20. | Give the isolation distance followed for paddy variety and hybrid. | | CO3 | U | 1 |
| PART – B (10 X 5 = 50 MARKS)  (Answer any 10 from the following) | | | | | |
| 21. | List the differences between seed and grain. | | CO2 | U | 5 |
| 22. | Explain the various internal and external factors affecting seed dormancy. | | CO4 | R | 5 |
| 23. | What are the various features in seed standards and field standards? | | CO3 | U | 5 |
| 24. | Explain the dicotyledonous seed with suitable sketches. | | CO1 | R | 5 |
| 25. | What are the factors affecting seed marketing? List the various activities followed in the promotion of seed sales. | | CO6 | U | 5 |
| 26. | List the duties and powers of a Seed Inspector. | | CO2 | R | 5 |
| 27. | Describe the factors affecting seed longevity during seed storage. | | CO6 | R | 5 |
| 28. | Explain the different ways to maintain genetic purity. | | CO3 | U | 5 |
| 29. | List the importance of seed drying. What are the various methods followed for seed drying? | | CO6 | U | 5 |
| 30. | Explain the role of OECD and WTO. | | CO6 | R | 5 |
| 31. | Describe the agronomic principles to be applied during seed production. | | CO3 | A | 5 |
| 32. | What is organic farming? Describe the various steps in organic seed production. | | CO3 | U | 5 |
| PART – C (2 X 15 = 30 MARKS)  (Answer any 2 from the following) | | | | | |
| 33. | a. | Elaborate on the varietal deterioration of seeds and measures to control. | CO5 | U | 7 |
|  | b. | What is a synthetic seed? Explain the stages of production of synthetic seed. | CO2 | R | 8 |
|  |  |  |  |  |  |
| 34. | a. | Explain the different stages of seed multiplication with a neat diagram. | CO2 | U | 7 |
|  | b. | Suggest suitable steps to maintain seed purity in the seed production of paddy. | CO3 | A | 8 |
|  |  |  |  |  |  |
| 35. | a. | Describe the various phases during seed certification process. | CO5 | U | 7 |
|  | b. | List any 10 important salient features of Seed Act 1966. | CO2 | R | 8 |

CO – COURSE OUTCOME BL – BLOOM’S LEVEL

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|  | COURSE OUTCOMES |
| CO1 | Understand the importance of quality seed in agriculture production. |
| CO2 | Distinguish types of seeds and know seed certification process |
| CO3 | Apply seed production techniques in cereals, pulses, and oilseeds, vegetable and forage seeds |
| CO4 | Describe seed structure and morphology, physical characteristics of seed |
| CO5 | Conduct varietal identification, seed quality assessments tests and seed treatments |
| CO6 | Remember the concepts in seed storage and seed marketing |

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| Assessment Pattern as per Bloom’s Taxonomy | | | | | | | |
| CO / P | R | U | A | An | E | C | Total |
| CO1 | 6 | 1 |  |  |  |  | 7 |
| CO2 | 23 | 15 |  |  |  |  | 38 |
| CO3 | 1 | 18 | 13 |  |  |  | 32 |
| CO4 | 6 | 1 | 1 |  |  |  | 8 |
| CO5 | 3 | 16 |  |  |  |  | 19 |
| CO6 | 11 | 10 |  |  |  |  | 21 |
|  | | | | | | | 125 |



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| **Course Code** | **20AG2014** | **Duration** | **3hrs** |
| **Course Name** | **MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the microorganisms involved in the conversion of ammonia to nitrites and nitrites to nitrates. | | CO2 | R | 1 |
| 2. | Define complex fertilizers. Give 2 examples with nutrient content. | | CO1 | U | 1 |
| 3. | Cite three phosphorus supplying fertilizers with nutrient content. | | CO1 | R | 1 |
| 4. | List few nitrogen fixing biofertilizers. | | CO3 | R | 1 |
| 5. | Explain crop logging method of soil fertility evaluation. | | CO5 | R | 1 |
| 6. | Explain the Criteria of essentiality as proposed by Arnon and Stout. | | CO2 | R | 1 |
| 7. | Describe the *Aspergillus niger* test of soil fertility evaluation techniques. | | CO4 | R | 1 |
| 8. | The C:N ratio above which immobilization occurs is \_\_\_\_\_\_\_\_\_\_ | | CO2 | U | 1 |
| 9. | Who proposed inductive cum targeted yield approach? | | CO6 | An | 1 |
| 10. | Define nano fertilizers. | | CO1 | R | 1 |
| 11. | Identify the deficient nutrient for the following deficiency symptoms  a. Purplish discolouration of leaves  b. leaf tip drying and marginal scorching | | CO5 | U | 1 |
| 12. | Critical Limit Approach of fertilizer recommendation was given by \_\_\_\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 13. | Identify the deficient nutrient for the given symptoms  a. Interveinal chlorosis of older leaves  b. Fruit cracking | | CO2 | U | 1 |
| 14. | Write the nutrient composition of FYM. | | CO4 | R | 1 |
| 15. | List out the fertility ratings for nitrogen in soil. | | CO4 | R | 1 |
| 16. | Which nutrient is referred to as traffic police man? | | CO5 | A | 1 |
| 17. | Mention the year of promulgation of The Fertilizer Control Order. | | CO1 | R | 1 |
| 18. | List the nutrient composition of MoP and SSP. | | CO1 | R | 1 |
| 19. | Give few examples of slow release nitrogenous fertilizers. | | CO1 | R | 1 |
| 20. | Find the nutrient associated with the Khaira disease of rice. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the mechanisms of nutrient transport to plants. | | CO2 | U | 5 |
| 22. | Evaluate the fertility of soil through microbiological methods. | | CO4 | A | 5 |
| 23. | Justify the need for fertilizer legislation in India and its activities. | | CO1 | C | 5 |
| 24. | Suggest fertilizer application techniques for rainfed and irrigated conditions. | | CO6 | An | 5 |
| 25. | Describe transformations of micronutrients in soil and factors affecting their availability. | | CO2 | U | 5 |
| 26. | Discuss the importance and advantages of nano fertilizers. | | CO1 | A | 5 |
| 27. | Explain the different methods of soil fertility evaluation through plant analysis. | | CO4 | An | 5 |
| 28. | Explain the preparation of any 2 bulky organic manures. | | CO3 | U | 5 |
| 29. | Discuss on the role of organic manures in soil health and crop production. | | CO3 | A | 5 |
| 30. | Classify the phosphorus fertilizers based on its composition and properties. | | CO1 | An | 5 |
| 31. | Classify the secondary fertilizers based on its composition and properties. | | CO1 | R | 5 |
| 32. | Suggest cultivation practices that could improve Nitrogen Use Efficiency. | | CO4 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Illustrate with neat diagram, the functions and deficiency symptoms of macronutrients in plants. | CO5 | A | 7 |
|  | b. | Substantiate the application of advanced techniques like remote sensing, precision farming in sustainable crop production. | CO3 | E | 8 |
|  |  |  |  |  |  |
| 34. | a. | Illustrate the nitrogen transformations in soil with a neat diagram. | CO2 | U | 7 |
|  | b. | Appraise the various fertilizer recommendation approaches practiced in India. | CO3 | E | 8 |
|  |  |  |  |  |  |
| 35. | a. | Illustrate with neat diagram, the functions and deficiency symptoms of micronutrients in plants. | CO5 | A | 7 |
|  | b. | Discuss on Integrated Nutrient Management and its practices for sustainable crop production. | CO3 | C | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the properties of manures, fertilizers and soil amendments |
| CO2 | Summarize the concepts of soil fertility and plant nutrition and chemistry of nutrients in soil. |
| CO3 | Demonstrate Integrated Nutrient Management and fertilizer recommendation practices |
| CO4 | Evaluate the fertility of soil |
| CO5 | Analyze the plant nutrient content |
| CO6 | Recommend fertilizer dosage for different soil types |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 1 | 5 | 5 |  | 5 | 26 |
| CO2 | 2 | 19 |  |  |  |  | 21 |
| CO3 | 1 | 5 | 5 |  | 16 | 8 | 35 |
| CO4 | 3 |  | 5 | 5 |  | 5 | 18 |
| CO5 | 2 | 1 | 15 |  |  |  | 18 |
| CO6 | 1 |  | 6 |  |  |  | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **Fundamentals of Plant Pathology** | **Duration** | **3hrs** |
| **Course Name** | **20AG2015** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Calcium deficiency in tomato causes --------------- symptom. | | CO1 | R | 1 |
| 2. | Who is considered as Father of bacteriology? | | CO1 | R | 1 |
| 3. | Give an example of carpogenous sclerotia. | | CO3 | U | 1 |
| 4. | Example of naked asci producing plant pathogen---------------- | | CO3 | U | 1 |
| 5. | The sporangia of *Albugo* are attached with each other by ----------------- | | CO3 | R | 1 |
| 6. | Define fungicide. | | CO6 | R | 1 |
| 7. | Recall the asexual fruiting body of *Colletotrichum.* | | CO3 | U | 1 |
| 8. | Name a total root parasite. | | CO2 | R | 1 |
| 9. | Name the vector which transmits little leaf of brinjal----------------- | | CO4 | R | 1 |
| 10. | Recommend a specific fungicide to manage downy mildew diseases. | | CO6 | A | 1 |
| 11. | Name the pathogen responsible for fire blight of apple and pear. | | CO2 | R | 1 |
| 12. | Give examples of any two obligate parasites. | | CO2 | U | 1 |
| 13. | The Bengal famine in the year of 1942-43 was caused due to the outbreak of --------. | | CO1 | R | 1 |
| 14. | Minute propagative units of the fungus is called as -------------- | | CO3 | R | 1 |
| 15. | Recall and write any two viral diseases affecting crops. | | CO1 | A | 1 |
| 16. | Name the nutrient absorbing organ of fungal pathogen. | | CO3 | An | 1 |
| 17. | Rust having a long life cycle with five spore stages is termed as----------------- | | CO3 | U | 1 |
| 18. | Gene for gene hypothesis was put forth by---------------- | | CO1 | R | 1 |
| 19. | Define hyperplasia. | | CO3 | R | 1 |
| 20. | Cite one phytohormone along with the disease name which causes deformities. | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the general characters of *Ascomycota* with suitable examples. | | CO2 | A | 5 |
| 22. | Differentiate the characters of *Rhizopus* and *Mucor.* | | CO2 | An | 5 |
| 23. | Explain the process of asexual reproduction of plant pathogens with a neat diagram. | | CO3 | An | 5 |
| 24. | Classify plant diseases based on the occurrence and severity. | | CO2 | U | 5 |
| 25. | Summarize the sporangiophore branching in downy mildew fungi with a suitable diagram. | | CO3 | U | 5 |
| 26. | Classify bacteria based on flagella arrangement with suitable diagrams. | | CO2 | U | 5 |
| 27. | Distinguish between Oidium, Oidiopsis and Ovulariopsis powdery mildew with a neat diagram. | | CO3 | An | 5 |
| 28. | Define the following  Thallus, Rhizomorph, Haustoria, Sporodochium and Pycnidia | | CO3 | R | 5 |
| 29. | Summarize the dispersal of plant pathogens. | | CO4 | U | 5 |
| 30. | Distinguish between vertical and horizontal resistance in plant disease management. | | CO5 | An | 5 |
| 31. | Write in detail about any five historical events in Plant pathology. | | CO1 | A | 5 |
| 32. | Differentiate alternate and collateral host. | | CO3 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Indicate the five types of spores produced by rust pathogen and draw the life cycle of wheat stem rust. | CO3 | U | 8 |
|  | b. | Illustrate crozier formation with a neat and well labelled diagram. | CO3 | A | 7 |
|  |  |  |  |  |  |
| 34. | a. | Classify the fungicides as per the translocation in the plants and elaborate copper and sulphur fungicides. | CO6 | An | 8 |
|  | b. | Summarize and draw the life cycle of *Phytophthora* *sp.* | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the diagnostic symptoms produced by club root of cabbage and draw the life cycle. | CO2 | An | 8 |
|  | b. | List out the principles of crop disease management and explain the biological and cultural control methods. | CO6 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **COURSE OUTCOMES** | | | | | | | | |
| CO1 | | Review the factors responsible for disease development. | | | | | | | | |
| CO2 | | Analyze the importance of different plant pathogens with their characteristics and classification. | | | | | | | | |
| CO3 | | Correlate the reproduction, survival and transmission of plant pathogens with disease development. | | | | | | | | |
| CO4 | | Conceptualize the mode of dispersal, role of enzymes and toxins in disease development. | | | | | | | | |
| CO5 | | Analyze defense mechanism in plants and the epidemiological factors. | | | | | | | | |
| CO6 | | Comprehend plant disease management. | | | | | | | | |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | | |
| **CO / P** | | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | | 9 | 1 | 1 | - | - | - | 11 |
| CO2 | | 2 | 11 | 5 | 13 | - | - | 31 |
| CO3 | | 8 | 24 | 7 | 16 | - | - | 55 |
| CO4 | | 1 | 5 | - | - | - | - | 6 |
| CO5 | | - | - | - | - | 5 | - | 5 |
| CO6 | | 1 | - | 8 | 8 | - | - | 17 |
|  | | | | | | | | **125** |



|  |  |  |  |
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| **Course Code** | **20AG2016** | **Duration** | **3hrs** |
| **Course Name** | **DISEASES OF FILED AND HORTICULTURAL CROPS AND THEIR MANAGEMENT- II** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the alternate host of black stem rust of wheat. | | CO3 | R | 1 |
| 2. | Explain the symptoms of grassy shoot of sugarcane. | | CO2 | U | 1 |
| 3. | Cite any two examples for soil borne pathogens. | | CO4 | U | 1 |
| 4. | Name the pathogen responsible for producing black colour acervuli on onion scales. | | CO2 | R | 1 |
| 5. | Name the causal organism for purple blotch of onion. | | CO3 | R | 1 |
| 6. | List down the types of mango malformation. | | CO2 | R | 1 |
| 7. | Give the typical symptom produced by *Alternaria* sp. | | CO2 | U | 1 |
| 8. | Write the symptoms of *Capnodium* sp. on mango. | | CO2 | A | 1 |
| 9. | Write the causal organism of Stem gall of coriander. | | CO3 | A | 1 |
| 10. | Name the pathogen involved in converting central shoot into long whip like structure. | | CO3 | R | 1 |
| 11. | Write the specific fungicide for managing downy and powdery mildew. | | CO6 | A | 1 |
| 12. | List down the spores produced by *Fusarium* spp. | | CO3 | R | 1 |
| 13. | Recall and write the vector which transmits chilli leaf curl virus. | | CO3 | R | 1 |
| 14. | Name the causal organism of creamy raised pustules on mustard leaves. | | CO3 | R | 1 |
| 15. | Write the diagnostic symptoms of powdery mildew of cucurbits. | | CO2 | R | 1 |
| 16. | List out the important symptoms of black arm of cotton. | | CO2 | R | 1 |
| 17. | Name the causal organism responsible for earcockle of wheat. | | CO3 | R | 1 |
| 18. | Name the bacterial disease infecting citrus and apple. | | CO3 | R | 1 |
| 19. | Write an example for phanerogamic stem parasite infecting mango. | | CO3 | A | 1 |
| 20. | Name the chemical produced by karnal bunt of wheat under field conditions. | | CO3 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain in detail about *Sclerotinia* stem rot of sunflower and its management practices. | | CO5 | An | 5 |
| 22. | Explain in detail about early and late blight of potato with pathogen character and management. | | CO5 | An | 5 |
| 23. | Write the symptoms of the following diseases   1. Fruit rot of chilli 2. Black leaf spot of rose 3. Wilt of bengalgram 4. Pokkah boeng disease of sugarcane | | CO2 | A | 5 |
| 24. | Explain the symptoms, pathogen characters and mode of spread of citrus canker. | | CO3 | An | 5 |
| 25. | Elaborate the symptom and mode of spread of potato virus diseases. | | CO3 | U | 5 |
| 26. | Write a short note on damage symptoms and pathogen characters of any three fungal diseases mustard. | | CO3 | A | 5 |
| 27. | Explain the diagnostic symptoms of wilt and Ascochyta blight of gram. | | CO3 | An | 5 |
| 28. | Write a short note on diseases on onion. | | CO5 | A | 5 |
| 29. | Explain the vascular bacterial wilt of cucumber along with pathogen characters and vector. | | CO4 | A | 5 |
| 30. | Write short notes on the following diseases: leaf spot of coriander, powdery mildew of rose and grapevine anthracnose. | | CO3 | A | 5 |
| 31. | Explain the following   1. Resting structure of *Fusarium* sp. 2. Asexual fruiting body of *Colletotrichum* sp. 3. Sexual spore of *Plasmospara* *viticola* 4. Sexual fruiting body of *Erysiphe* sp. 5. Asexual spore of *Phytophthora* sp. | | CO1 | An | 5 |
| 32. | Distinguish between the symptoms, spore characters of *Fusarium* and *Verticillium* wilt of cotton. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Illustrate the disease cycle of black stem of rust along with symptoms. | CO3 | A | 7 |
|  | b. | Explain major diseases of mango with their pathogen characters and management. | CO5 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Explain in detail the fungal diseases of sugarcane, with symptoms, pathogen characters and management. | CO5 | U | 7 |
|  | b. | Explain the symptoms, pathogen characters and management measures of four important diseases of apple. | CO5 | U | 8 |
|  |  |  |  |  |  |
| 35. | a. | Write the symptoms and pathogen characters of downy and powdery mildew of grapes. | CO3 | A | 8 |
|  | b. | Explain the symptoms, pathogen characters and management of peach leaf curl and turmeric leaf spot. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall various plant pathological terms and basic concepts of important plant diseases |
| CO2 | Explain the disease symptoms of various plant diseases of field and horticultural crops |
| CO3 | Interpret the host pathogen interaction on disease development in field and horticultural  Crops |
| CO4 | Determine the prevalence, epidemiology and factors affecting disease development |
| CO5 | Apply the concept of integrated management practices to control diseases of field and  horticultural crops |
| CO6 | Recommend management practices for diseases of different crop plants |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  |  | 5 |  |  | 5 |
| CO2 | 4 | 2 | 6 |  |  |  | 12 |
| CO3 | 8 | 10 | 28 | 10 |  |  | 56 |
| CO4 |  | 1 | 5 |  |  |  | 6 |
| CO5 |  | 30 | 5 | 10 |  |  | 45 |
| CO6 |  |  | 1 |  |  |  | 1 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **20AG2017** | **Duration** | **3hrs** |
| **Course Name** | **POST-HARVEST MANAGEMENT AND VALUE ADDITION OF FRUITS AND VEGETABLES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the chemical used in lye peeling. | | CO1 | R | 1 |
| 2. | Write the processing temperature for canning of vegetables. | | CO1 | U | 1 |
| 3. | Expand ZECC. | | CO5 | U | 1 |
| 4. | Give the name of apple wine. | | CO3 | R | 1 |
| 5. | Name the precursor of ethylene. | | CO3 | R | 1 |
| 6. | List any two chilling injury symptoms in fruits. | | CO2 | R | 1 |
| 7. | Mention the TSS of marmalade. | | CO3 | R | 1 |
| 8. | Name the equipment used for measuring pectin content. | | CO3 | R | 1 |
| 9. | Give the other name for cold sterilization. | | CO2 | U | 1 |
| 10. | Expand FSSAI. | | CO6 | R | 1 |
| 11. | Deficiency of which nutrient will lead to hen and chicken disorder in grapes. | | CO4 | R | 1 |
| 12. | Write any one maturity index for harvesting papaya. | | CO2 | R | 1 |
| 13. | Name the radioisotope used in irradiation of foods. | | CO3 | R | 1 |
| 14. | Name the enzymes responsible for browning in fruits and vegetables. | | CO2 | A | 1 |
| 15. | What is weeping of jelly? | | CO2 | R | 1 |
| 16. | What is sheet or flake test? | | CO3 | R | 1 |
| 17. | Name the precursor of ethylene. | | CO4 | R | 1 |
| 18. | Name an oxygen scavenger. | | CO5 | U | 1 |
| 19. | What is exhausting? | | CO3 | U | 1 |
| 20. | Name any two Class -I preservative. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate between pasteurization and sterilization. | | CO3 | An | 5 |
| 22. | List out the advantages of fruit and vegetable preservation. | | CO1 | An | 5 |
| 23. | Discuss in detail about CA storage. | | CO3 | An | 5 |
| 24. | List the functions of packaging. | | CO5 | R | 5 |
| 25. | Write a note on vacuum packaging. | | CO5 | A | 5 |
| 26. | Write the principles of food preservation. | | CO1 | A | 5 |
| 27. | Explain different methods of food preservation. | | CO1 | An | 5 |
| 28. | List the different food laws. | | CO6 | An | 5 |
| 29. | Discuss about the preservation by freezing. | | CO6 | E | 5 |
| 30. | What is ripening? Write the changes occur during ripening. | | CO2 | An | 5 |
| 31. | What is chemical preservation? List the major classes of chemicals used in food preservation with examples. | | CO2 | U | 5 |
| 32. | Briefly describe about Modified Atmospheric Packaging (MAP). | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What is respiration? Explain about the factors affecting respiration rate in fruits and vegetables. | CO2 | A | 7.5 |
|  | b. | What is precooling? Elaborate different precooling methods. | CO3 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write about the technologies for extension of shelf life of fruits & vegetables. | CO2 | E | 7.5 |
|  | b. | Summarize different fermentation methods employed in fruit and vegetable processing. | CO3 | E | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Write in detail about ZECC. | CO5 | C | 7.5 |
|  | b. | What is canning? Elaborate the process involved in canning technique. | CO5 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Remember the different post-harvest management of important fruits and vegetables |
| CO2 | Understand the factors causing post-harvest losses in fruits and Vegetables |
| CO3 | Explain about the different value addition process of important fruits and vegetables |
| CO4 | Analyze the market, demand and supply chain for important fruits and vegetables |
| CO5 | Recommend suitable storage structures and packaging methods for postharvest management of fruits and vegetables |
| CO6 | Demonstrate knowledge about the different government schemes and laws in import and export of fruits and vegetables |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | 1 | 5 | 10 | - | - | 17 |
| CO2 | 4 | 6 | 8.5 | 5 | 7.5 | - | 31 |
| CO3 | 6 | 1 | - | 17.5 | 7.5 | - | 32 |
| CO4 | 2 | - | - | - | - | - | 2 |
| CO5 | 5 | 7 | 12.5 | - | - | 7.5 | 32 |
| CO6 | 1 | - | - | 5 | 5 | - | 11 |
|  | | | | | | | **125** |



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| **Course Code** | **20EN2001** | **Duration** | **3hrs** |
| **Course Name** | **COMPREHENSION AND COMMUNICATION SKILLS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | | **CO** | **BL** | | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | |
| 1. | Write the synonym of **Destroy**.  **Demolish** **/ Create** | | | CO1 | U | | 1 |
| 2. | Write the prefix to form the antonym.  Children often ------behave in order to get attention. | | | CO1 | R | | 1 |
| 3. | George Bernard Shaw spoke ‘Spoken English and Broken English’ on a …………. recording for the Lingua-phone Institute. | | | CO2 | R | | 1 |
| 4. | Fill in each space with the suitable preposition:  The squirrel hid the nuts ………… a pile of leaves. | | | CO3 | U | | 1 |
| 5. | Choose the right word to complete the sentence:  A …………… is bound to take place in our country sooner or later. The …………… against the dictator was put down with an iron hand (rebellion, revolution). | | | CO1 | U | | 1 |
| 6. | Fill in with the homophone that gives the correct meaning :  The children play during the ……...  brake/ break | | | CO1 | U | | 1 |
| 7. | Frame sentences with following homophones:  Plate  Plait | | | CO3 | U | | 1 |
| 8. | The interviews which take place annually to review the progress of the interviewee are called the ……………. | | | CO2 | U | | 1 |
| 9. | Fill in each space with correct preposition: ***in*, *at* or to.**  Sheela drives …… the restaurant usually ….. the morning ….. 9.00 am. | | | CO3 | U | | 1 |
| 10. | Change into indirect speech:  Peter said, ‘I go to the park everyday’. | | | CO3 | U | | 1 |
| 11. | Fill in with the word that gives the correct meaning:  I would rather eat a slice of chocolate cake \_\_\_\_\_\_\_\_(than, then) eat a chocolate muffin. | | | CO1 | U | | 1 |
| 12. | In which of the following sentences is the word “hour” used correctly?   1. The bus will leave the school in one hour 2. I will take our books back to the library 3. Last night hour dog got loose and ran fast 4. This is hour house and we need to paint it | | | CO1 | U | | 1 |
| 13. | Fill in the blank with correct article:  Raju plays with ….. ball in …. ground. | | | CO5 | U | | 1 |
| 14. | Identify the verb that agrees with the subject.  Bread and butter ……. (is/are) a wholesome food. | | | CO3 | R | | 1 |
| 15. | Add a prefix to form the opposite of the words.  (i) treat (ii) agree. | | | CO1 | U | | 1 |
| 16. | Choose the right word.  What medicine did the doctor ………..(prescribe / proscribe) for her? | | | CO1 | U | | 1 |
| 17. | Choose the appropriate word and fill up the blanks.  He is the \_\_\_\_\_\_\_\_\_\_of a plan to make slow pupils understand the difference between a \_\_\_\_\_\_\_\_\_\_ and a multiplier (deviser, divisor) | | | CO6 | U | | 1 |
| 18. | Change to direct speech:  Kumar asked me if I was happy that day. | | | CO1 | U | | 1 |
| 19. | Fill in the blanks with appropriate homophones:  The word ring means a sound and the other meaning is ……………… (circle/ still) | | | CO3 | U | | 1 |
| 20. | Fill in with the appropriate preposition:  Can you prevent others \_\_\_\_\_\_\_\_\_\_ cheating your friends? | | | CO1 | U | | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | |
| 21. | Explain elaborately on any two types of interview. | | | CO6 | | R | 5 |
| 22. | Write a paragraph on the topic ‘War vs Science’. | | | CO6 | | R | 5 |
| 23. | Competitive sports are a cause for ill-will - Substantiate from “War Minus Shooting”. | | | CO3 | | R | 5 |
| 24. | Narrate the author’s view of sport in “War Minus Shooting”. | | | CO4 | | R | 5 |
| 25. | Write your view on the importance of English spoken in India. | | | CO5 | | U | 5 |
| 26. | Describe your favorite hobby and sport. | | | CO4 | | A | 5 |
| 27. | Read the passage and answer the questions given below:  Food can maintain and save life. It can destroy life as well. Proper food serves as medicine, improper food works as poison. A little care about the quality and quantity of food will keep us healthy and happy. If we go about eating all sorts of things, we shall become sick.  We take pride in calling ourselves civilized. Being sensible means to know the difference between good and bad, right and wrong. It will not do to become slaves to our tongue or taste. Even cattle, birds and beasts eat only what is best for their body.  We mostly eat processed food and refined sugar. We pay heavily for junk food, for Chinese dishes or deep fried snacks. As a result we catch diseases. We have drifted away from mother nature. We laugh at the rules of hygiene, healthy diet and the advice of our elders. This has given rise to diabetes.  We offer chocolates, cakes and ice creams too often to our children. We also attend parties or dine out every day. This way we invite obesity and diabetes.  1) What does food do to our life?  2) How do we become sick by eating food?  3) Being civilized, how are we supposed to behave?  4) What type of food brings diseases to our body?  5) How do we invite obesity? | | | CO4 | | U | 5 |
| 28. | Write a paragraph about an insect. Make sure to use scientific data and observations to create strong support within the paragraph. | | | CO5 | | A | 5 |
| 29. | Write a report on the Independence day event to be published in the college magazine. | | | CO5 | | U | 5 |
| 30. | List out five Homophones and frame sentences. | | | CO3 | | R | 5 |
| 31. | List out five Homonyms and frame sentences. | | | CO3 | | R | 5 |
| 32. | Write a short note on how English is spoken in native land. | | | CO4 | | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | |
| 33. | | a. | Make a precise writing for the following passage:  Until a hundred years ago as humans, we had a simple, uncomplicated biological connect. It was a straightforward equation: we drew roughly 3, 000 calories each of energy out of the Earth for our food and life’s sustenance. Today that number per capita has grown to 1, 00, 000 calories. We still need only 3, 000 calories each to nourish life itself. All the rest of this energy is what we extract from the Earth for everything else besides keeping ourselves alive. In some countries, like the US; this per capita number runs at over 2, 00, 000 calories! Some of us are concerned about this.  We fret over what we could and should really be doing to soften this abuse of resources. Little things fix us in the welter of things that we get to read. What is sustainable development? How can it be started in our homes? Beyond the ceremonial planting of green arid getting people to run marathons of various lengths in support of the environment, is there- more that we can add to the abstract value of “sustainability”? What are the little things we can do in our day-to-day lives, to reduce demand for things that people make and market? Of course, we know that it helps to avoid a plastic bag when you can use a newspaper bag, or a brown bag, or even a jute bag which you can use for many more years, unlike a plastic bag which you throw away in less than a week or after a few uses. However, there’s actually quite a bit more than you and I can do without compromise on comfort, with very little as cost incurred, with financial savings that you can gain on energy and water use, and with solutions that are very feasible and within your reach. It is possible to understand our ecological footprint and its disastrous consequences, not merely in terms of our own behaviour as consumers, but really in terms of the impact on the environment we make. | CO1 | | U | 5 |
|  | | b. | Prepare five slides to present it in your class on the topic “Mobile Addiction”. | CO1 | | A | 10 |
|  | |  |  |  | |  |  |
| 34. | | a. | Write a short report on the ‘Technological effects on society’ you witnessed recently. | CO2 | | U | 5 |
|  | | b. | Write a letter to M/S Shining Star 79, Durga Nagar, Jammu, complaining about the delay in the delivery of the books you have ordered. | CO3 | | U | 10 |
|  | |  |  |  | |  |  |
| 35. | | a. | Draft a job application letter along with your CV for the position of Agriculture Field officer. | CO3 | | A | 15 |
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|  | **COURSE OUTCOMES** |
| CO1 | Comprehend spoken and written discourse |
| CO2 | Listen attentively to lectures and formal speeches |
| CO3 | Write effectively in academic and work place. |
| CO4 | Speak effectively in formal and informal situations |
| CO5 | Utilize team spirit and leadership qualities |
| CO6 | Employ skills to face interviews and competitive exams |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 2 | 13 | 11 |  |  |  | 26 |
| CO2 | 1 | 6 |  |  |  |  | 7 |
| CO3 | 15 | 16 | 15 |  |  |  | 46 |
| CO4 | 5 | 10 | 5 |  |  |  | 20 |
| CO5 |  | 10 |  |  |  |  | 15 |
| CO6 | 10 | 1 |  |  |  |  | 11 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1001** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRONOMY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Agronomy. | | CO1 | R | 1 |
| 2. | What is Soil fertility? | | CO1 | U | 1 |
| 3. | Define Conservation tillage. | | CO3 | R | 1 |
| 4. | Discuss on the characteristics of fertile soil. | | CO2 | U | 1 |
| 5. | Illustrate on Crop density. | | CO2 | R | 1 |
| 6. | What are the signs of maturity in Pulses? | | CO2 | R | 1 |
| 7. | Define Crop Rotation. | | CO6 | U | 1 |
| 8. | List out the methods of threshing. | | CO3 | R | 1 |
| 9. | Define Erosion and its types. | | CO3 | R | 1 |
| 10. | What is physiological maturity? | | CO1 | R | 1 |
| 11. | Write pH of fertile soil. | | CO3 | A | 1 |
| 12. | Define drying. | | CO6 | R | 1 |
| 13. | List out the implements used for tillage operation. | | CO3 | U | 1 |
| 14. | What are the types of Dormancy? | | CO3 | U | 1 |
| 15. | Define Irrigation Scheduling. | | CO3 | R | 1 |
| 16. | Write the stages of seed multiplication. | | CO3 | R | 1 |
| 17. | Write some harmful effects of weeds. | | CO4 | R | 1 |
| 18. | Discuss about Translocation of herbicides in plants. | | CO4 | U | 1 |
| 19. | Differentiate between macro nutrient and micro nutrient. | | CO5 | R | 1 |
| 20. | Define drip irrigation. | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the scope and importance of agronomy. | | CO1 | A | 5 |
| 22. | Explain aquatic and problematic weeds and their management. | | CO4 | R | 5 |
| 23. | Define Tillage. Write its objectives of tillage. | | CO3 | R | 5 |
| 24. | What are the factors affecting growth & development? | | CO4 | U | 5 |
| 25. | Classify the weeds based on nature with suitable examples. | | CO4 | U | 5 |
| 26. | Elaborate on the Modern Concept of Tillage. | | CO3 | U | 5 |
| 27. | List out the characteristics of a good seed. | | CO3 | R | 5 |
| 28. | Explain on objective and methods of seed treatment. | | CO3 | U | 5 |
| 29. | Classify herbicides based on selectivity, mode of application and time of application. | | CO4 | U | 5 |
| 30. | What are the conditions favorable for weeds seed germination? | | CO3 | R | 5 |
| 31. | What are the losses caused by weeds? | | CO3 | R | 5 |
| 32. | Write a note on crop geometry and its importance. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define irrigation schedules. Write note on advantages and critical growth stages of crops. | CO3 | R | 7.5 |
|  | b. | Classify the essential plant nutrients for plant growth. | CO4 | U | 7.5 |
| 34. | a. | Describe about the preventive measures of weed control. | CO4 | U | 7.5 |
|  | b. | Discuss about tillage on soil physical properties. | CO4 | U | 7.5 |
| 35. | a. | List out the types of Herbicides and mode of application. | CO4 | R | 7.5 |
|  | b. | Identify the crop management technologies in problematic areas. | CO6 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand basics of crop characteristics and its classification |
| CO2 | Outline the basics of crop characteristics and its classifications |
| CO3 | Identify crops, seeds, fertilizers, pesticides, farm /tillage implements |
| CO4 | Acquire scientific knowledge on weeds, its impacts on crop growth and integrated weed management |
| CO5 | Apply fundamentals of growth concepts, factors influencing and its relationship to nutrients |
| CO6 | Describe crop rotation, its principles and apply knowledge of crop management techniques in crop Production |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 1 | 5 | - | - | - | 8 |
| CO2 | 7 | 1 |  | - | - | - | 8 |
| CO3 | 32.5 | 13 | 1 | - | - | - | 46.5 |
| CO4 | 13.5 | 38.5 |  | - | - | - | 52 |
| CO5 | 1 | - | - | - | - | - | 1 |
| CO6 | 1 | 8.5 | - | - | - | - | 9.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1001** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRONOMY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Which revolution is responsible for the tremendous increase in food grain production? | | CO1 | R | 1 |
| 2. | What type of seeds are commonly used by the farmers? What is its genetic purity? | | CO2 | R | 1 |
| 3. | Which tillage is considered as an extreme form of minimum tillage? How weeds are controlled in that tillage?. | | CO3 | An | 1 |
| 4. | What do you understand by “optimum plant density” ? | | CO2 | C | 1 |
| 5. | What is meant by cash crops ?. Give one example. | | CO3 | U | 1 |
| 6. | What are the forms in which nitrogen is absorbed by plants? | | CO3 | U | 1 |
| 7. | The incorporation of green matter into the soil transported from elsewhere is known as ------------------ leaf manuring. | | CO3 | R | 1 |
| 8. | What is the K2O percentage in MOP? | | CO3 | C | 1 |
| 9. | What are the Nitrogen biofertilizers used in pulses and cereals? | | CO3 | A | 1 |
| 10. | Among the annual agricultural loss in India, weeds account for ----------- %, | | CO4 | An | 1 |
| 11. | Distinguish between pre-emergence and post emergence herbicides. | | CO4 | E | 1 |
| 12. | Any direct or indirect harmful effect that one plant species has on another species through the production of chemical substances that release in to the environment is known as --------------------- . | | CO4 | R | 1 |
| 13. | Define leaf area index (LAI). | | CO5 | C | 1 |
| 14. | The dependence of growth on temperature is characterised by a minimum, optimum and maximum temperature for each phase in the life of a plant. These temperature ranges known as ----------------- points of temperature. | | CO5 | R | 1 |
| 15. | What percentage of atmospheric gases is nitrogen ? | | CO5 | U | 1 |
| 16. | ------------ ideotype performs best at commercial crop densities because it is a poor competitor. | | CO5 | R | 1 |
| 17. | Define crop rotation. | | CO5 | A | 1 |
| 18. | Yearly sequence and spatial arrangement of crops or crops and fallow on a given area is known as ------------------ pattern. | | CO5 | U | 1 |
| 19. | Name the machine which can harvest, thresh and clean grains simultaneously in various kinds of crops. | | CO6 | E | 1 |
| 20. | ------------------ rice variety is mostly exported to European Union and USA by India. | | CO6 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define seed treatment. What are the objectives of seed treatment? | | CO2 | A | 5 |
| 22. | Distinguish between straight, complex and mixed fertilizers with examples. | | CO3 | An | 5 |
| 23. | Define integrated nutrient management (INM). Indicate the components and advantages of INM. | | CO3 | A | 5 |
| 24. | Write a short note on crop weed competition. | | CO4 | E | 5 |
| 25. | Write a short note on agronomic classification of crops. | | CO3 | U | 5 |
| 26. | Define herbicide. Differentiate between selective and non- selective herbicides with examples. | | CO4 | R | 5 |
| 27. | Differentiate between dry farming, dryland farming and rainfed farming. | | CO5 | C | 5 |
| 28. | Define growth. List out the soil factors affecting plant growth. | | CO5 | E | 5 |
| 29. | Write a short note on crop adaptation to temperature and precipitation. | | CO5 | R | 5 |
| 30. | Explain determinate growth and indeterminate growth with examples. | | CO5 | E | 5 |
| 31. | What are factors that affect storage of grains. Mention the obvious reasons for storing grains. | | CO6 | An | 5 |
| 32. | Explain the value added products of rice. | | CO6 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain different methods of sowing seeds. | CO2 | E | 8 |
|  | b. | Define tillage. Explain the different types of tillage | CO3 | A | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define integrated weed management (IWM). What are the components of IWM? Give a short note on various cultural methods of weed management. | CO4 | U | 8 |
|  | b. | Explain the advantages and disadvantages of herbicidal control of weeds. | CO4 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Define crop rotation with an example. Explain the principles of crop rotation. | CO5 | R | 8 |
|  | b. | Define cropping system and explain the classification of cropping system. | CO5 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand branches of agriculture, evolution of scientific agriculture and agronomy |
| CO2 | Seeds and sowing, tillage, crop geometry and plant density, crops and classification |
| CO3 | Study and identify crops, seeds, fertilizers, manures, pesticides, farm /tillage implements |
| CO4 | Acquire scientific knowledge on weeds, its impacts on crop growth, methods of weed management, herbicide action in plants, allelopathy. |
| CO5 | Study growth concepts, growth and yield analysis, factors affecting growth, plant ideotypes, crop rotation, major crops of India and cropping systems |
| CO6 | Harvest and post- harvest technology of major crops, storage, marketing and support prices. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 |  |  |  |  |  | 1 |
| CO2 | 1 |  | 5 |  | 8 | 1 | 15 |
| CO3 | 1 | 7 | 13 | 6 |  | 1 | 28 |
| CO4 | 6 | 8 |  | 8 | 6 |  | 28 |
| CO5 | 15 | 2 | 1 |  | 10 | 13 | 41 |
| CO6 |  |  | 5 | 6 | 1 |  | 12 |
|  | 24 | 17 | 24 | 20 | 25 | 15 | 125 |



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| **Course Code** | **21AG1002** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL HERITAGE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | …………… is a high-value spice. | | CO2 | R | 1 |
| 2. | Which is the right sequence considering the period of cultivation? | | CO1 | R | 1 |
| 3. | Which is the year of establishment of Indian meteorological department. | | CO1 | U | 1 |
| 4. | The duration of cenozic era is of---- | | CO3 | U | 1 |
| 5. | The village tank system is observed in the place of --------- | | CO4 | A | 1 |
| 6. | Which was the period of severe famine? | | CO4 | U | 1 |
| 7. | The duration of the Ice Age is---- | | CO3 | R | 1 |
| 8. | Historical evidence showed that agriculture started around------- | | CO5 | R | 1 |
| 9. | Silk moth was domesticated for the first time in which country? | | CO1 | R | 1 |
| 10. | Cultivation of rice is started in ----------- | | CO6 | R | 1 |
| 11. | The great Bengal famine of Bengal was related to which crop? | | CO6 | R | 1 |
| 12. | Four Vedas mentioned the species of plant more than----- | | CO6 | R | 1 |
| 13. | Evidence that fire was first used by-------- | | CO5 | U | 1 |
| 14. | The bronze age period is about---- | | CO4 | A | 1 |
| 15. | Cultivation of crops Wheat and Barley started in ------- | | CO3 | R | 1 |
| 16. | Old Stone age is also called---- | | CO1 | U | 1 |
| 17. | Parts of the skull, hand, leg, and feet were discovered by---- | | CO2 | R | 1 |
| 18. | Neolithic age is------- | | CO2 | R | 1 |
| 19. | Physical condition of soil obtained out of tillage is --------- | | CO1 | U | 1 |
| 20. | The most ancient literary work of India is-------- | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on agriculture in India. | | CO1 | R | 5 |
| 22. | What is agricultural heritage? Why one should study agricultural heritage? | | CO2 | A | 5 |
| 23. | Define Globally Important Agriculture Systems (GIAHS). Give some examples of GIAHS. | | CO1 | An | 5 |
| 24. | Write a brief note on the crops cultivated during the Indus civilization. | | CO3 | R | 5 |
| 25. | Explain the special features of indigenous technical knowledge. | | CO3 | E | 5 |
| 26. | Write the scope of agriculture. | | CO3 | R | 5 |
| 27. | Explain about revolution in agriculture. | | CO5 | An | 5 |
| 28. | Explain the era of civilization. | | CO5 | E | 5 |
| 29. | Write a short note on land degradation and conservation measures. | | CO6 | E | 5 |
| 30. | Definition and meaning of ITK. | | CO4 | E | 5 |
| 31. | Write a brief account of water management and irrigation practices in the Indian sub-continent during the Vedic period. | | CO3 | U | 5 |
| 32. | What was the situation of fish farming during the Indus period? | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the agricultural situation of the Vedic period with special reference to crops cultivated and management practices. | CO2 | R | 8 |
|  | b. | Write a brief note on the Agricultural Technology Management Agency. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain how crop voyage improved the diversity of crops in India. | CO5 | A | 7 |
|  | b. | Explain about crop diversification programme. | CO6 | An | 8 |
|  |  |  |  |  |  |
| 35. | a. | Discuss about women in Agriculture and empowerment. | CO6 | E | 7 |
|  | b. | Explain about role of ITKs in traditional agriculture. | CO3 | A | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the agricultural heritage of India, agricultural resources, and development of Indian |
| CO2 | agriculture from the ancient to the modern era |
| CO3 | Compare indigenous traditional knowledge in agriculture and crop voyage in India and the world |
| CO4 | Describe gender perspective, tasks of farm women, women empowerment and self-help groups |
| CO5 | Apply Indigenous Traditional Knowledge (ITK) in modern agricultural practices |
| CO6 | Visualize the transition of agriculture from past to present |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 3 |  | 5 |  |  | 15 |
| CO2 | 11 |  | 5 |  |  |  | 16 |
| CO3 | 12 | 6 | 8 |  | 5 |  | 31 |
| CO4 | 5 | 9 | 2 |  | 5 |  | 21 |
| CO5 | 1 | 1 | 7 | 13 | 5 |  | 27 |
| CO6 | 3 |  |  |  | 12 |  | 15 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1002** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL HERITAGE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Agriculture. | | CO1 | R | 1 |
| 2. | Paleolithic age also called as……… was evolved in the year of ……… | | CO1 | R | 1 |
| 3. | The word ‘lithium’ comes from a …………. word which means ……………. | | CO1 | U | 1 |
| 4. | List out branches of Agriculture. | | CO1 | R | 1 |
| 5. | Aryan land was called …………….. which means the land of seven rivers | | CO1 | U | 1 |
| 6. | The term Yellow Revolution related with ……….., white revolution with………… and Blue Revolution with …………… production. | | CO1 | U | 1 |
| 7. | Imperial Agricultural Research Institute (IARI) was established at ………… | | CO1 | A | 1 |
| 8. | Willow tree experiment was conducted by ………… in the year of 1572-1644. | | CO2 | R | 1 |
| 9. | Define ‘Liebig law of minimum’. | | CO2 | A | 1 |
| 10. | Inverse yield nitrogen law was proposed by …………. in the year of ……….. | | CO2 | A | 1 |
| 11. | IRRI stands for ……………… located at …………….. | | CO2 | U | 1 |
| 12. | Alluvial soil is also called as………………, ………………. & …………….. | | CO2 | R | 1 |
| 13. | ……….. & ……….. soils are very rich in organic matter. | | CO2 | An | 1 |
| 14. | What is meant by Indigenous Technical Knowledge? | | CO2 | R | 1 |
| 15. | List out the minor millets. | | CO3 | R | 1 |
| 16. | What are the three basic elements of green revolution? | | CO3 | R | 1 |
| 17. | To provide improved access to irrigation and enhanced water efficiency,………….. scheme was started. | | CO3 | U | 1 |
| 18. | Abbreviate CGIAR. | | CO4 | R | 1 |
| 19. | Define GDP. | | CO4 | An | 1 |
| 20. | …………….. is determined by reference to genetic and anatomical characteristics, but socially learned gender is an acquired identity. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Give a brief note on problem soils and their characteristics. | | CO2 | E | 5 |
| 22. | Recommend ITK practices for harvesting, threshing and storage pest control. | | CO2 | E | 5 |
| 23. | Classify the crops based on ontogeny and botany with suitable examples. | | CO3 | U | 5 |
| 24. | Discuss about sugar and oilseed crops and their economic importance. | | CO3 | C | 5 |
| 25. | Write about rationales and objectives of green revolution in India. | | CO3 | R | 5 |
| 26. | Elaborate the characteristics and problems of Indian agriculture. | | CO4 | C | 5 |
| 27. | Explain the role of women in agriculture and its allied fields. | | CO5 | C | 5 |
| 28. | Write about present status of agriculture in India. | | CO6 | R | 5 |
| 29. | Give a short note on constraints in adoption of technology by women. | | CO6 | E | 5 |
| 30. | What is Ergonomics and write about their approaches and characteristics. | | CO6 | R | 5 |
| 31. | Give a note on Indus civilization. | | CO1 | E | 5 |
| 32. | List out the chronological events in scientific agriculture. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Brief about agricultural systems in the world. | CO4 | C | 8 |
|  | b. | Describe Gender Perspectives and Gender Concepts in Agriculture. | CO5 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Write about the developmental stages of civilization and agriculture by Archaeologist. | CO2 | R | 8 |
|  | b. | Explain multi-dimensional role of women in agriculture. | CO5 | C | 7 |
|  |  |  |  |  |  |
| 35. | a. | Relate the Kautilya statement to today's agricultural situation. | CO1 | A | 8 |
|  | b. | Write about the Early Common Era and important innovations during the period in India. | CO1 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand agricultural heritage of India, agricultural resources and development of Indian agriculture from ancient to modern era |
| CO2 | Compare indigenous traditional knowledge in agriculture and crop voyage in India and the world |
| CO3 | Describe gender perspective, tasks of farm women, women empowerment and self-help groups |
| CO4 | Apply Indigenous Traditional Knowledge (ITK) in modern agricultural practices |
| CO5 | Visualize transition of agriculture from past to present |
| CO6 | Acquire knowledge on gender issues in agriculture for women empowerment and implement women-friendly agricultural technologies |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 3 | 9 | - | 5 | - | 27 |
| CO2 | 16 | 1 | 2 | 1 | 10 | - | 30 |
| CO3 | 7 | 6 | - | - | - | 5 | 18 |
| CO4 | 1 | - | - | 1 | - | 13 | 15 |
| CO5 | 8 | - | - | - | - | 12 | 20 |
| CO6 | 10 | - | - | - | 5 | - | 15 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1003** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTION TO FORESTRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | \_\_\_\_\_\_\_\_\_\_\_\_\_is defined as the renewal of a forest crop by natural or artificial means.  a) Recreation b) Regeneration c) Degeneration d) Reproduction | | CO1 | R | 1 |
| 2. | The practice of forestry on farmlands is known as\_\_\_\_\_\_\_\_\_  a) Roadline forestry b) Social forestry c) Farm forestry d) Extension forestry | | CO3 | R | 1 |
| 3. | According to national forest policy, the forest cover in the plains should be  a) 43% b) 23% c) 33% d) 53% | | CO1 | R | 1 |
| 4. | Which branch of forestry deals with the establishment, development, care, and reproduction of timber\_\_\_\_\_\_\_\_  a. Sericulture b.Olericulture c.Floriculture d.Silviculture | | CO2 | R | 1 |
| 5. | The forest which is more or less the same age is\_\_\_\_\_\_\_\_\_\_  a. Uneven aged forest b. Even aged forest c. Normal forest  d. Abnormal forest | | CO1 | R | 1 |
| 6. | Scientific name of Teak\_\_\_\_\_\_\_\_\_\_  a. *Melia dubia* b. *Pterocarpus marsupium* c. *Dalbergia* *latifolia* d. *Tectona grandis* | | CO1 | R | 1 |
| 7. | The establishment of a forest by artificial means on an area from which forest vegetation has always or long been absent is called\_\_\_\_\_\_\_\_\_\_  a. Reforestation b. Afforestation c. Deforestation d. None of the above | | CO1 | R | 1 |
| 8. | The best seed treatment technique in teak is\_\_\_\_\_\_\_\_  a. Alternate wetting and drying b. Cold water treatment c. Hot water treatment d. Acid treatment | | CO2 | R | 1 |
| 9. | Fibers are known as silk cotton or kapok used for stuffing purposes (Pillows, mattresses, cushions & upholstery articles) is obtained from\_\_\_\_\_\_\_\_\_  a. *Pinus roxburghii* b. *Ceiba pentandra*  c. *Eucalyptus tereticornis*  d. *Simarouba glauca* | | CO2 | R | 1 |
| 10. | Define Forest. | | CO1 | U | 1 |
| 11. | Explain natural regeneration. | | CO1 | U | 1 |
| 12. | Casuarina Seed weight is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ seeds/gram.  a. 600 b. 750 c. 700 d. 650 | | CO2 | R | 1 |
| 13. | *Acacia leucophloea* with *Cenchrus ciliaris-based* agroforestry system is called \_\_\_\_\_\_\_\_\_\_\_\_  a. Hortipasture b. Silvipasture c. Agropasture d. Oleripasture | | CO4 | R | 1 |
| 14. | The volume of trees was estimated using the formula\_\_\_\_\_\_\_\_\_\_\_  a. V=πr3 b. V=πr3h c. V=πr2h d. V= πd2h | | CO3 | R | 1 |
| 15. | The word Social forestry was coined by  a. Munshi b. Barr and Stroud c. Dietrich Brandis d. Westoby | | CO3 | R | 1 |
| 16. | Wood treated with synthetic resins, oil, paraffin, and wax is called\_\_\_\_\_\_  a. Treated wood b. Synthetic wood c.Impregnated wood d. Engineered wood | | CO3 | R | 1 |
| 17. | Write the scientific name for Red sanders, Maharuk, Malabar neem, and Gulmohar. | | CO1 | R | 1 |
| 18. | What is shifting cultivation? | | CO3 | R | 1 |
| 19. | Define agroforestry. | | CO2 | U | 1 |
| 20. | Define coppicing. | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the classification of forests on various basis. | | CO1 | U | 5 |
| 22. | Write an essay on the silvicultural practices of teak. | | CO2 | U | 5 |
| 23. | Define forest mensuration. Write the objectives of forest mensuration. | | CO3 | R | 5 |
| 24. | Explain salient features of the National Agroforestry Policy, 2014. | | CO3 | U | 5 |
| 25. | Difference between tending and cultural operations. Write the importance of tending. | | CO3 | An | 5 |
| 26. | Write a detailed note on social forestry and its types. | | CO3 | U | 5 |
| 27. | Explain tree crop interaction in agroforestry. | | CO4 | U | 5 |
| 28. | Explain briefly extension forestry and its types. | | CO3 | U | 5 |
| 29. | Write a detailed note on the production (tangible) benefits of forests. | | CO1 | U | 5 |
| 30. | Write an essay on the silvicultural practices of Eucalyptus. | | CO2 | U | 5 |
| 31. | Describe briefly on Composite/Improved wood. | | CO4 | U | 5 |
| 32. | Explain the plywood manufacturing process. | | CO4 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define Forest regeneration. Explain the types of regeneration. | CO1 | R | 8 |
|  | b. | Explain the factors affecting the choice between Natural Regeneration and Artificial Regeneration. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Discuss about quality seedling production techniques. | CO3 | U | 7.5 |
|  | b. | Describe vegetative propagation. Write its advantages. | CO3 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the height measurement methods in trees. | CO3 | U | 8 |
|  | b. | Explain the volume calculation in standing and felled trees. | CO3 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the forest ecosystem and forest regeneration |
| CO2 | Remember the concepts of agroforestry practiced in various agroecosystems |
| CO3 | Apply the knowledge for developing agroforestry, windbreaks, shelter belts, silviculture, and Social Forestry |
| CO4 | Recall the multipurpose trees in agroforestry systems |
| CO5 | Analyze the impact of nitrogen fixation, and carbon sequestration and develop strategies for climate Mitigation |
| CO6 | Explain the beneficial effects of agroforestry in relation to nitrogen fixation, soil conservation,  litter dynamics and nutrient cycles |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 14 | 19 | - | - | - | - | 33 |
| CO2 | 4 | 11 | - | - | - | - | 15 |
| CO3 | 10 | 46 | - | 5 | - | - | 61 |
| CO4 | 1 | 15 | - | - | - | - | 16 |
| CO5 | - | - | - | - | - | - | - |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1003** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTION TO FORESTRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The word FOREST is derived from the Latin word\_\_\_\_\_\_\_\_\_\_\_  a. Foris b. Fores c Floris d. None of the above | | CO1 | R | 1 |
| 2. | Strip of trees planted to protect fields, homes and canals from wind is referred to as \_\_\_\_\_\_\_\_\_\_\_\_  a. Wind break b. Shelterbelts c. Live fences d. Tree barriers | | CO3 | R | 1 |
| 3. | The practice of forestry on lands outside the conventional forest area for the benefit of the rural and urban communities is called\_\_\_\_\_\_\_\_  a. Extension forestry b. Canal forestry c.Social Forestry d. Railline forestry | | CO3 | R | 1 |
| 4. | The state having the highest forest cover as % of its area is \_\_\_\_\_\_\_  a. Assam b. Mizoram c. Arunachala Pradesh d. Jharkhand | | CO1 | R | 1 |
| 5. | Define Forestry. | | CO1 | U | 1 |
| 6. | What is artificial regeneration? | | CO1 | R | 1 |
| 7. | Define pollarding. | | CO2 | U | 1 |
| 8. | The species used for preparation of match splints in match industry in Tamil Nadu is\_\_\_\_\_\_\_\_\_.  a. *Ailanthus excelsa* b. *Santalum album* c. *Pterocarpus santalinus* d. *Melia dubia* | | CO4 | R | 1 |
| 9. | The production of woody perennial combined with annuals and pastures is called \_\_\_\_\_\_\_\_\_\_\_.  a. Hortipasture b. Agrisilvopasture c. Hortisilvopasture d. Home garden | | CO3 | R | 1 |
| 10. | MFP refers to\_\_\_\_\_\_\_\_  a. Major Forest Produce b. Max. Forest produce c. Min. Forest produce d.Minor Forest produce | | CO3 | R | 1 |
| 11. | The Upper branchy part of a tree is called\_\_\_\_\_\_\_\_\_\_  a. Apex b. Bunch c. Head d. Crown | | CO2 | R | 1 |
| 12. | Write the scientific name for Eucalyptus, Casuarina, Sandal and Neem. | | CO1 | R | 1 |
| 13. | What is alley cropping? | | CO3 | R | 1 |
| 14. | Write the benefits of social forestry. | | CO3 | R | 1 |
| 15. | The main criteria for good agroforestry design are\_\_\_\_\_\_\_\_  a) Productivity b) Sustainability c) Adaptability d) All the above | | CO2 | R | 1 |
| 16. | A forest composed of almost entirely of one species, usually to the extent of not less than 80% is called\_\_\_\_\_\_  a. Diversified forest b. Mixed forest c. Combined forest d. Pure forest | | CO1 | R | 1 |
| 17. | National Forest Policy started at\_\_\_\_\_\_\_\_  a. 1998 b.1978 c. 1988 d. 2008 | | CO2 | R | 1 |
| 18. | The branch of forestry that deals with the measurement of the diameter, height, and volume of the tree is called\_\_\_\_\_\_  a. Forest Mensuration b. Forest Estimation c. Forest Quantification d. Forest computation | | CO3 | R | 1 |
| 19. | The renewal of a forest crop by self-sown seed or by coppice or root suckers is called\_\_\_\_\_\_\_  a. Artificial regeneration b. Natural Regeneration c. Afforestation d. Reforestation | | CO1 | R | 1 |
| 20. | Forest having canopy density between 10 - 40 % is called as  a) Dense forest b) Moderately open forest c) Open forest d) Thick forest | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write an essay on the role of the forest. | | CO1 | U | 5 |
| 22. | Explain salient features of National Forest Policy, 1988. | | CO3 | U | 5 |
| 23. | Write an essay on Non-timber forest products/Minor forest produce. | | CO3 | U | 5 |
| 24. | Explain briefly various seed treatment techniques in teak. | | CO2 | U | 5 |
| 25. | Explain the silvicultural practices of Ailanthus. | | CO2 | U | 5 |
| 26. | Explain the factors affecting the establishment of seedlings. | | CO3 | U | 5 |
| 27. | Differentiate wind break and shelter belt. Write the characteristics of wind break and shelter belt. | | CO3 | An | 5 |
| 28. | Explain the silvicultural practices of Melia. | | CO2 | U | 5 |
| 29. | Write a note on the history, objectives, and benefits of social forestry. | | CO3 | U | 5 |
| 30. | Describe tree-crop interaction in the agroforestry system. | | CO4 | U | 5 |
| 31. | Write an essay on agroforestry system classification. | | CO4 | U | 5 |
| 32. | Write the important characteristics of alley-cropping trees. Explain the design of alley cropping. Write the species suited for alley cropping. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the history of agroforestry in India. Write the benefits and limitations of agroforestry. | CO2 | U | 8 |
|  | b. | What is Taungya system? Explain the types of Taungya systems. Write the advantages and disadvantages of the Taungya system. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define nursery. Explain the objects and types of the nursery. | CO1 | U | 7.5 |
|  | b. | Define reforestation. Explain the objects of reforestation with examples. | CO1 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Define vegetative propagation. Explain the types of vegetative propagation techniques. | CO3 | U | 7.5 |
|  | b. | Define thinning. Explain the methods of thinning. Write the objectives of thinning. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the forest ecosystem and forest regeneration |
| CO2 | Remember the concepts of agroforestry practiced in various agroecosystems |
| CO3 | Apply the knowledge for developing agroforestry, windbreaks, shelter belts, silviculture, and Social Forestry |
| CO4 | Recall the multipurpose trees in agroforestry systems |
| CO5 | Analyze the impact of nitrogen fixation, and carbon sequestration and develop strategies for climate Mitigation |
| CO6 | Explain the beneficial effects of agroforestry in relation to nitrogen fixation, soil conservation,  litter dynamics and nutrient cycles |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 21 | - | - | - | - | 28 |
| CO2 | 3 | 24 | - | - | - | - | 27 |
| CO3 | 7 | 41 | - | 5 |  |  | 59 |
| CO4 | 1 | 10 | - | - | - | - | 11 |
| CO5 | - | - | - | - | - | - | - |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG1051** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRICULTURAL ECONOMICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | | **Questions** | | **CO** | **BL** | | **Marks** | |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | | |
| 1. | | Who is called as father of Economics? | | CO1 | R | | 1 | |
| 2. | | What is agricultural economics? | | CO3 | R | | 1 | |
| 3. | | Choose true or false. Marginal utility concept is used to explain diamond water paradox. | | CO2 | A | | 1 | |
| 4. | | What does inflation mean? | | CO6 | R | | 1 | |
| 5. | | Classify the three categories of goods and services that satisfy human wants | | CO2 | An | | 1 | |
| 6. | | Name the utility created during storage of a commodity | | CO2 | R | | 1 | |
| 7. | | What is called as NABARD? | | CO4 | R | | 1 | |
| 8. | | Define consumption. | | CO2 | R | | 1 | |
| 9. | | Choose true or false. Any tangible commodity that satisfies human want is called as service. | | CO2 | A | | 1 | |
| 10. | | What is called as wealth? | | CO1 | R | | 1 | |
| 11. | | Which type of economic system is followed in India? | | CO1 | R | | 1 | |
| 12. | | What is the name of the income earned by labourer when he lends his labour in the production process | | CO1 | R | | 1 | |
| 13. | | What is called as monopoly? | | CO3 | R | | 1 | |
| 14. | | When price of good X increases then what happens to supply of a good X? | | CO3 | R | | 1 | |
| 15. | | Which is the first five-year plan period in India? | | CO6 | R | | 1 | |
| 16. | | List the examples for direct and indirect tax. | | CO5 | An | | 1 | |
| 17. | | Name the methodology of economics which descends from general to particular. | | CO1 | R | | 1 | |
| 18. | | What is called as fiscal policy? | | CO6 | R | | 1 | |
| 19. | | Who put forth the welfare definition of economics. | | CO1 | R | | 1 | |
| 20. | | What is called as ordinal utility concept? | | CO2 | R | | 1 | |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | | |
| 21 | Determine the concept of consumer surplus and write its practical  importance in economy. | | | CO2 | | R | | 5 |
| 22. | Compare micro and macro economics. | | | CO1 | | An | | 5 |
| 23. | Summarize the features of perfectly competitive and imperfect markets | | | CO3 | | U | | 5 |
| 24. | Elaborate the law of demand. | | | CO2 | | C | | 5 |
| 25. | Explain the different types of inflation. | | | CO6 | | E | | 5 |
| 26. | Classify and explain the different types of cost with graph. | | | CO3 | | An | | 5 |
| 27. | Discuss Malthusian theory. | | | CO6 | | C | | 5 |
| 28. | Outline the concept of rent, wage, interest and profit. | | | CO1 | | U | | 5 |
| 29. | Differentiate Positive and normative economics. | | | CO1 | | U | | 5 |
| 30. | Illustrate the circular flow of money in an economy. | | | CO4 | | U | | 5 |
| 31. | Justify the importance of canons of taxation. | | | CO6 | | E | | 5 |
| 32 | Explain the law of supply. | | | CO3 | | U | | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | | |
| 33. | a. | | Discuss the characteristics of agriculture, its importance and role in economic development. | CO3 | | C | | 7.5 |
|  | b. | | Explain the law of diminishing marginal utility with graph. Recall its assumptions, limitations and importance. | CO2 | | U | | 7.5 |
|  |  | |  |  | |  | |  |
| 34. | a. | | Elaborate the various concepts of National income accounting. | CO6 | | C | | 7.5 |
|  | b. | | Criticize the Barter system of exchange and explain the evolution, meaning and functions of money. | CO4 | | E | | 7.5 |
|  |  | |  |  | |  | |  |
| 35. | a. | | List the important features of capitalistic, socialistic, and mixed economy. | CO1 | | An | | 7.5 |
|  | b. | | Apply the law of variable proportions and explain it with three stages of production function. | CO3 | | A | | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the principle and theories, and its role in planning for economic development of the country |
| CO2 | Remember consumer behaviour - utility maximization problem and demand theory |
| CO3 | Explain fundamental concepts of agricultural economics, theory of production, theory of cost and output determination across market structures |
| CO4 | Evaluate different agricultural finance systems and their role as credit agencies |
| CO5 | Enumerate and discuss different taxes applicable to agriculture |
| CO6 | Analyze the theory of general equilibrium and welfare economics |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 10 | - | 12.5 | - | - | 28.5 |
| CO2 | 8 | 7.5 | 2 | 1 |  | 5 | 23.5 |
| CO3 | 3 | 10 | 7.5 | 5 | - | 7.5 | 33 |
| CO4 | 1 | 5 |  |  | 7.5 |  | 13.5 |
| CO5 |  |  |  | 1 |  |  | 1 |
| CO6 | 3 |  |  |  | 10 | 12.5 | 25.5 |
|  | **21** | **32.5** | **9.5** | **19.5** | **17.5** | **25** | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1101** | **Duration** | **3hrs** |
| **Course Name** | **COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The word communication is derived from which Latin word. | | CO1 | R | 1 |
| 2. | What does W in SWOT analysis stands for? | | CO5 | U | 1 |
| 3. | Searching for a specific word in an article uses ………………….method of reading. | | CO2 | A | 1 |
| 4. | Name any two methods of note taking. | | CO3 | R | 1 |
| 5. | What is the meaning of the word precise? | | CO3 | R | 1 |
| 6. | A way of feeling or acting towards a person, thing or situation is called as ………………. . | | CO4 | R | 1 |
| 7. | --------------------------type of stress have a postive effect on health. | | CO5 | U | 1 |
| 8. | Communication with the help of eye movements is also called as ……………. | | CO1 | U | 1 |
| 9. | Correct the sentence: The small child does whatever his father **was done** | | CO2 | A | 1 |
| 10. | The distance between two individuals in close space is more than social space (True/ False). | | CO1 | A | 1 |
| 11. | Communication through space is called as …………………….. | | CO1 | U | 1 |
| 12. | ----------------------is the leadership style that values the input of team members and peers. | | CO5 | U | 1 |
| 13. | What is communication happening through body language called? | | CO1 | U | 1 |
| 14. | ---------- Ice-cream. Complete the word with a suitable vowel. | | CO2 | A | 1 |
| 15. | Name a technique used in summarizing. | | CO3 | R | 1 |
| 16. | ……….. is the process whereby one individual influences other group members towards the attainment of defined group or organizational goals. | | CO5 | U | 1 |
| 17. | Which is the most common element that prevents people from public speaking | | CO3 | U | 1 |
| 18. | Define personality. | | CO5 | R | 1 |
| 19. | Who is an endomorph? | | CO5 | R | 1 |
| 20. | Communication with the help of letters and words is called as …………. communication. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the elements of communication. | | CO1 | R | 5 |
| 22. | Which are the different forms of non- verbal communication? | | CO1 | R | 5 |
| 23. | Differentiate between eustress and distress with examples. | | CO5 | A | 5 |
| 24. | Explain any two methods of note taking. | | CO3 | A | 5 |
| 25. | Explain the types of communication based on directions. | | CO1 | U | 5 |
| 26. | What do you mean by abstracting? Which are the different abstracting techniques? | | CO3 | R | 5 |
| 27. | Elaborate on some methods to reduce stress in our day to day lives. | | CO5 | A | 5 |
| 28. | Differentiate between indexing and bibliography. | | CO3 | An | 5 |
| 29. | Explain the Do’s and Don’ts in an individual presentation. | | CO3 | A | 5 |
| 30. | Differentiate between intensive and extensive reading. | | CO2 | A | 5 |
| 31. | What do you understand by the process of interview? | | CO5 | U | 5 |
| 32. | Explain any three types of leadership. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the factors influencing attitude formation. | CO3 | A | 8 |
|  | b. | Explain the different factors which causes stress. | CO5 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the personality types given by Sheldon. | CO5 | An | 8 |
|  | b. | Explain the importance of SWOT analysis in an organization. | CO5 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Summarize the article on ‘importance of education in less than 100 words’  To put it in simple terms, education is the process of acquiring knowledge and skills, building morals, values, and developing habits. Education does not just consist of these. The process of education can be said to be complete only if you are able to put the knowledge you acquire to good use. So, education is not just gaining knowledge and gathering information but developing the ability to apply what you have learned to daily life scenarios.  Is there good education and bad education? This is a question that has been asked for years now. Good education works towards the goal of preparing and empowering individuals to lead a productive life that definitely impacts the economic growth of the society and country they are a part of. Good education is meant to stimulate logical and critical thinking in individuals. Good education does not mean scoring high marks in your assessments. People usually perceive the notion that schooling and scoring good marks in examinations is education. Education is beyond all that. Schooling alone does not lead to learning. Getting a good education depends on a lot of factors, including the environment or society you are in, the social and economic background and the ability of the individual to understand, analyse and act according to the need of the hour.  It is a fact that quality education and skill development comes from strong education systems. Having trained and empathetic teachers is one of the prerequisites to availing good education. Education includes learning about different cultures, religions, communities, economic and social standards and grooming oneself to become a socially responsible individual. With the advancement of technology, teachers have been taken for granted because most children nowadays have their own mobile phones and internet access with which they can find answers to any questions, sometimes questions their parents, siblings, or teachers cannot explain. This is a huge drawback in the process of building a healthy society. | CO3 | A | 8 |
|  | b. | Imagine you are Robin, a BSc. Agri graduate from Karunya University. You are applying for jobs in various companies. Prepare a one-page resume indicating your contact details (imaginary), educational information, internship experience, skills, extracurricular activities, language proficiency and achievements. | CO6 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Apply indexing, footnote and bibliographic procedures |
| CO2 | Understand the comprehension of articles. |
| CO3 | Summarize and abstract. |
| CO4 | Participate and organize group discussions and seminars |
| CO5 | Develop listening, writing and oral presentation skills |
| CO6 | Maintain field diary and lab record |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 12 | 8 | 1 | - | - | - | 21 |
| CO2 | 5 | - | 13 | - | - | - | 18 |
| CO3 | 8 | 1 | 26 | 5 | - | - | 40 |
| CO4 | 1 | - | - | - | - | - | 1 |
| CO5 | 2 | 9 | 17 | 10 | - | - | 38 |
| CO6 | - | - | 7 | - | - | - | 7 |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG1151** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF ENTOMOLOGY** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the pinning region for true bugs …………………….. | | CO1 | R | 1 |
| 2. | Define: Moulting. | | CO1 | U | 1 |
| 3. | Name the type of antenna present in house fly ……………. | | CO1 | R | 1 |
| 4. | The major constituent of insect cuticle is………………….. | | CO1 | R | 1 |
| 5. | Chemicals used to kill the insects are called as ………………. | | CO4 | R | 1 |
| 6. | Name the type of forewing in grasshopper ………………… | | CO1 | R | 1 |
| 7. | Mosquito pupa is called as ………………… | | CO1 | R | 1 |
| 8. | Name the type of wing coupling present in honey bees………………. | | CO1 | R | 1 |
| 9. | An opaque spot present on the costal margin of wings of Odonata is ……….. | | CO1 | U | 1 |
| 10. | Give an example for seasonal pest ……………………. | | CO3 | R | 1 |
| 11. | Name the type of reproduction that occurs without fertilization ……………. | | CO2 | R | 1 |
| 12. | Hypermetamorphism is seen in ……………… | | CO1 | R | 1 |
| 13. | True flies are classified under the order ……………………… | | CO5 | R | 1 |
| 14. | Ants are classified under the family……………… | | CO5 | R | 1 |
| 15. | The major excretory organ in insects …………………………. | | CO2 | U | 1 |
| 16. | ……………… is the basic unit of classification. | | CO5 | R | 1 |
| 17. | Butterflies are classified under the order …………………….. | | CO5 | R | 1 |
| 18. | Expand: ETL | | CO4 | R | 1 |
| 19. | ……………….. is the basic unit of nervous system | | CO2 | U | 1 |
| 20. | The time interval between subsequent moulting is called …………………. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the characters of class Insecta. | | CO1 | R | 5 |
| 22. | Illustrate the structure of insect body wall and explain their functions. | | CO1 | U | 5 |
| 23. | Define metamorphism and enumerate the types of metamorphism with suitable example. | | CO1 | R | 5 |
| 24. | Define IPM and enumerate the practices followed under IPM. | | CO4 | R | 5 |
| 25. | Discuss the modifications of insect antenna with examples. | | CO1 | U | 5 |
| 26. | Discuss the different types of wings in insects. | | CO1 | U | 5 |
| 27. | Extend the respiration in aquatic insects. | | CO2 | U | 5 |
| 28. | Evaluate the advantages and limitations of chemical control. | | CO4 | An | 5 |
| 29. | Illustrate the structure of insect neuron and discuss the types on neuron in insects. | | CO2 | U | 5 |
| 30. | Differentiate the suborder: Anisoptera and Zygoptera. | | CO5 | U | 5 |
| 31. | Differentiate the suborder: Caelifera and Ensifera. | | CO5 | U | 5 |
| 32. | Enumerate the characters of Order Lepidoptera. | | CO5 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the structure of insect leg and enumerate the various modifications in insect legs with suitable example. | CO1 | R | 8 |
|  | b. | Briefly discuss the reasons for dominance of insects. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the structure of male and female reproductive system with neat sketch. | CO2 | U | 8 |
|  | b. | Describe the structure and function of insect circulatory system with neat sketch. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Enumerate the general characters of Coleoptera along with five agriculturally important families. | CO5 | R | 8 |
|  | b. | i. Differentiate the suborder Heteroptera and Homoptera  ii. Discuss the characters of five agriculturally important families of Hemiptera. | CO5 | R  U | 4  3 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the insect external body parts and their modifications |
| CO2 | Acquire knowledge on structure of various organ systems and their functions |
| CO3 | Analyze the factors influencing pest occurrence |
| CO4 | Understand the concept of different pest management techniques |
| CO5 | Develop knowledge on different orders and families of agriculturally important pests |
| CO6 | Analyze the pest management strategies |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 26 | 24 | - | - | - | - | 50 |
| CO2 | 1 | 27 | - | - | - | - | 28 |
| CO3 | 1 | - | - | - | - | - | 1 |
| CO4 | 7 | - | - | 5 | - | - | 12 |
| CO5 | 21 | 13 | - | - | - | - | 34 |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG1201** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF GENETICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is telomere? | | CO1 | R | 1 |
| 2. | Test cross ratio of a monohybrid cross is ------------------------ | | CO1 | R | 1 |
| 3. | The number of chromosomes present in somatic cells of Drosophila …… | | CO2 | R | 1 |
| 4. | The pairing of homologous chromosome during meiosis is known as …. | | CO3 | R | 1 |
| 5. | Define crossing over. | | CO5 | U | 1 |
| 6. | The gametic chromosome number is represented as…………. | | CO4 | U | 1 |
| 7. | Another name for mitotic division. | | CO3 | U | 1 |
| 8. | Define the term, ‘Translocation’. | | CO1 | R | 1 |
| 9. | An organism having an extra chromosome along with its diploid number is known as ………… | | CO1 | An | 1 |
| 10. | Define pleiotropic. | | CO2 | An | 1 |
| 11. | What is point mutation? | | CO3 | E | 1 |
| 12. | What is Allelomorph? | | CO1 | E | 1 |
| 13. | What are polygenes? | | CO3 | U | 1 |
| 14. | Define transition. | | CO1 | R | 1 |
| 15. | What is ‘sex linkage’? | | CO1 | An | 1 |
| 16. | Cytoplasmic organelle involved in protein synthesis is \_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 17. | The main function of chlorophyll in plants is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO5 | U | 1 |
| 18. | What is holandric gene? | | CO5 | An | 1 |
| 19. | Name the scientist who proposed the double helical structure DNA. | | CO5 | R | 1 |
| 20. | Name the nitrogen bases present in DNA. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the genic balance theory. | | CO1 | An | 5 |
| 22. | Describe the structure of chromosome with a neat diagram. | | CO1 | U | 5 |
| 23. | Explain the inheritance of qualitative and quantitative characters. | | CO4 | E | 5 |
| 24. | What are laws of inheritance proposed by Mendel? | | CO5 | C | 5 |
| 25. | What are the different mechanisms of chromosomal sex determination? | | CO3 | U | 5 |
| 26. | Why did Mendel choose garden pea plants for his experiments? | | CO4 | U | 5 |
| 27. | Describe the salient features of genetic code. | | CO2 | An | 5 |
| 28. | What is cytoplasmic inheritance? | | CO3 | An | 5 |
| 29. | Differentiate between transcription and translation. | | CO5 | An | 5 |
| 30. | Differentiate between monohybrid and dihybrid with examples. | | CO4 | U | 5 |
| 31. | What is structural chromosomal aberration? List out its types and subtypes. | | CO6 | A | 5 |
| 32. | Explain the chromosome theory of linkage. Suggest the methods to detect linkage. | | CO1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the gene regulation and expression in prokaryotes. | CO2 | E | 7 |
|  | b. | Explain the different stages of Mitosis with neat diagram and its significance. | CO5 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | What is mutation? Explain the different types. | CO6 | E | 7 |
|  | b. | Give the classification of different types of mutagens. | CO4 | U | 8 |
|  |  |  |  |  |  |
| 35. | a. | Explain the different type of aneuploids and its significance. | CO2 | U | 7 |
|  | b. | Organize the stages of Meiosis with a neat diagram and its significance. | CO3 | An | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Solve problems on Mendelian genetics. |
| CO2 | Construct gene map using linkage |
| CO3 | Identify the type of aberrations and its usage in agriculture. |
| CO4 | Understand inducing mutation by artificial methods. |
| CO5 | Explain the central dogma of life. |
| CO6 | Adopt the knowledge of cytoplasmic inheritance in plant breeding. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 10 | 1 | 7 | - | 1 | 24 |
| CO2 | 2 | 7 | 1 | 6 | 7 | - | 23 |
| CO3 | 1 | 7 | - | 13 | - | 1 | 22 |
| CO4 | - | 19 | - | - | 5 | - | 24 |
| CO5 | - | 9 | - | 6 | - | 5 | 20 |
| CO6 | - | - | 5 | - | - | 7 | 12 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1301** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF SOIL SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Soil is a \_\_\_\_\_\_\_  a. Natural body b. Three-dimensional body  c. Living body d. All the above | | CO1 | R | 1 |
| 2. | The study of soil in relation to higher plants is known as\_\_\_\_\_\_\_\_\_\_\_\_  a. Petrology b. Pedology c. Edaphology d. Pedogenesis | | CO1 | U | 1 |
| 3. | The most resistant mineral to weathering is  a. Quartz b. Olivine c. Geothite d. Anorthite | | CO2 | A | 1 |
| 4. | The mineral containing Boron is  a. Gypsum b. Tourmaline c. Dolomite d. Haematite | | CO2 | A | 1 |
| 5. | Soil structural type with a longer horizontal axis than vertical axis is \_\_\_\_\_  a. Platy b. Prismatic c. Blocky d. Columnar | | CO3 | An | 1 |
| 6. | The ratio between incident energy and reflected energy radiation is called \_\_\_\_  a. Conduction b. Albedo c. Radiation d. Convection | | CO3 | An | 1 |
| 7. | Buffering capacity is \_\_\_\_\_\_\_\_\_ in clay soils than in sandy soils.  a. Less b. More c. Equal d. Medium | | CO4 | E | 1 |
| 8. | Example for 2:1 expanding type clay mineral  a. Montmorillonite clay b. Kaolinite clay c. Illite clay d. Chloriteclay | | CO4 | U | 1 |
| 9. | The process of conversion of proteins into amino acids is\_\_\_\_\_\_  a. Nitrification b. Ammonification c. Aminization d. Denitrification | | CO5 | U | 1 |
| 10. | The C:N ratio of Humus  a. 10:1 b. 20:1 c. 30:1 d. 40:1 | | CO5 | R | 1 |
| 11. | The process of destruction of solid waste at high temperatures is  a. Burning b. Pyrolysis c. Incineration d. Biomethanation | | CO6 | U | 1 |
| 12. | An approach that does not pollute the soil, groundwater and quality food for consumption is  a. Jhum cultivation b. industrial agriculture c. organic farming  d. all the above | | CO6 | U | 1 |
| 13. | Define soil. | | CO1 | U | 1 |
| 14. | Define Eluviation and Illuviation. | | CO2 | A | 1 |
| 15. | Define soil texture. | | CO3 | R | 1 |
| 16. | List any four properties of soil colloids. | | CO4 | A | 1 |
| 17. | Mention any two soil enzymes. | | CO5 | R | 1 |
| 18. | List the amendments used in soil management. | | CO6 | C | 1 |
| 19. | Write three variables in the Munsell color chart. | | CO3 | U | 1 |
| 20. | What is electrical conductivity? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define mineral. Give their detailed classification with examples. | | CO1 | U | 5 |
| 22. | Explain soil-forming factors. | | CO1 | E | 5 |
| 23. | Enumerate the soil orders and their characteristics as per USDA. | | CO2 | A | 5 |
| 24. | What are the major types of soils present in India? | | CO2 | U | 5 |
| 25. | a. Define bulk density & particle density. | | CO3 | U | 2 |
|  | b. Calculate the bulk density of the given soil. Height of core- 8 cm, radius of core – 3.5 & weight of oven dry soil is 450 gm. | | CO3 | E | 3 |
| 26. | Write the composition of soil air. Explain the gaseous exchange in soil and narrate the significance of soil air. | | CO3 | U | 5 |
| 27. | Write the source of charges in soil colloids. | | CO4 | E | 5 |
| 28. | List the factors affecting ion exchange in soil colloids. | | CO4 | An | 5 |
| 29. | What are the major fractions of organic matter? | | CO5 | E | 5 |
| 30. | Define humus. Describe the theories of humus formation. | | CO5 | A | 5 |
| 31. | Explain the techniques involved in pollution management. | | CO6 | E | 5 |
| 32. | Write about the major source of soil pollution. | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the fundamental soil-forming process with a neat diagram. | CO1 | A | 7.5 |
|  | b. | List out specific soil-forming processes and explain any two process. | CO1 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain in detail about the mode of heat transformation in soil. | CO3 | A | 7.5 |
|  | b. | Elaborate the effect of temperature on plant growth. | CO3 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Define the pH of soil. Furnish the significance of pH on the availability of nutrients. | CO4 | An | 7.5 |
|  | b. | Explain the various factors affecting soil pH. | CO4 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Knowledge gained about the soil forming process. |
| CO2 | Soil taxonomy & soil classification |
| CO3 | Physical properties of soil studied |
| CO4 | Various soil chemical properties and reactions are understood. |
| CO5 | Soil organic matter and soil organisms |
| CO6 | Impact of soil pollution and remediation measures learned |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | 7 | 7.5 | 7.5 | 5 |  | 28 |
| CO2 |  |  | 8 | 5 |  |  | 13 |
| CO3 | 1 | 8 | 7.5 | 9.5 | 3 |  | 29 |
| CO4 | 1 | 1 | 8.5 | 12.5 | 6 |  | 29 |
| CO5 | 2 | 1 | 5 |  | 5 |  | 13 |
| CO6 |  | 2 |  | 5 | 5 | 1 | 13 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1301** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF SOIL SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Differentiate between laterization and podzolisation. | | CO4 | R | 1 |
| 2. | Who has given the term “Soul of Infinite Life”? | | CO1 | R | 1 |
| 3. | Define pedoturbation. | | CO3 | U | 1 |
| 4. | What are all the components of ideal soil? | | CO1 | R | 1 |
| 5. | \_\_\_\_\_\_\_\_\_\_ soil order is dominant in India. | | CO4 | R | 1 |
| 6. | Best suited soil texture and structure for agriculture is \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_. | | CO3 | A | 1 |
| 7. | What do you mean by electrical conductivity ? | | CO5 | R | 1 |
| 8. | Define total water potential. | | CO3 | U | 1 |
| 9. | What is heterotrophic organism? | | CO5 | An | 1 |
| 10. | Give an Example for 1:1 non – expanding clay mineral. | | CO4 | R | 1 |
| 11. | Marble is formed from \_\_\_\_\_\_\_\_\_\_\_. | | CO1 | An | 1 |
| 12. | Fertilizer responsible for development of good structures of soil is\_\_\_\_\_\_\_. | | CO3 | U | 1 |
| 13. | Carbon di oxide is dissolved in water to form \_\_\_\_\_\_\_\_\_\_. | | CO4 | U | 1 |
| 14. | Name the process of transformation of raw organic into humus. | | CO5 | U | 1 |
| 15. | The consistency of dry soil is \_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 16. | What is infiltration? | | CO3 | An | 1 |
| 17. | Define soil pH. | | CO4 | R | 1 |
| 18. | List the humic substances. | | CO5 | R | 1 |
| 19. | Explain the process of ammonification. | | CO5 | U | 1 |
| 20. | Name the enzyme that breaks cellulose into simple sugars. | | CO5 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out any five endopedons and explain them. | | CO2 | R | 5 |
| 22. | Describe Physical and biological classification of water. | | CO3 | An | 5 |
| 23. | Explain the gaseous exchange phenomenon of soil and their importance. | | CO3 | U | 5 |
| 24. | Write about Buffering capacity of soil and their importance. | | CO4 | R | 5 |
| 25. | Explain the hierarchical classification of soil taxonomy. | | CO2 | U | 5 |
| 26. | What is modified lignin theory? | | CO5 | U | 5 |
| 27. | Explain Atterberg’s constants. | | CO3 | U | 5 |
| 28. | Explain the soil densities and the factors influencing it. | | CO3 | R | 5 |
| 29. | What are the factors affecting soil structure? | | CO3 | U | 5 |
| 30. | Explain soil forming factors. | | CO1 | R | 5 |
| 31. | Describe biological weathering of soil. | | CO1 | A | 5 |
| 32. | Write the classification of silicate minerals. | | CO1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the types of soil in India. | CO2 | R | 8 |
|  | b. | Discuss the specific soil forming processes in detail. | CO1 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Classify the physical weathering of soil in a brief manner. | CO1 | U | 8 |
|  | b. | Explain soil colloids and their types. | CO4 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | Determine the sources of charges and ion exchange reactions in soil. | CO4 | U | 8 |
|  | b. | What is soil pollution? Explain the behavior of organic and inorganic contaminants of soil. | CO6 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the genesis, pedological and edaphological concepts of soil |
| CO2 | Remember different system of soil classification |
| CO3 | Explain and evaluate the physical properties of soil |
| CO4 | Explain and estimate the physico-chemical properties of soil |
| CO5 | Describe the biological properties of soil and its influence |
| CO6 | Analyze the soil pollutant factors and recommend suitable remedial measures for soil improvement |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 13 | 5 | 8 | - | - | 33 |
| CO2 | 14 | 5 | - | - | - | - | 19 |
| CO3 | 5 | 18 | 1 | 1 | 5 | - | 30 |
| CO4 | 16 | 9 | - | - | - | - | 25 |
| CO5 | 2 | 7 | - | 2 | - | - | 11 |
| CO6 | - | - | - | 7 | - | - | 07 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1302** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTORY AGRO-METEOROLOGY & CLIMATE CHANGE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Expand WMO. | | CO2 | U | 1 |
| 2. | List out the Weather hazards. | | CO5 | R | 1 |
| 3. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is a line on a map or chart that connects points with the same temperature. | | CO3 | R | 1 |
| 4. | The kharif foodgrains production is dependent on monsoon. | | CO5 | U | 1 |
| 5. | The \_\_\_\_\_\_\_\_ is the primary source of energy on earth. | | CO5 | U | 1 |
| 6. | Solar constant is \_\_\_\_\_\_\_ cal/cm2/min. | | CO1 | R | 1 |
| 7. | Normal lapse rate is \_\_\_\_\_\_0C/km. | | CO2 | R | 1 |
| 8. | Give the different types of precipitation. | | CO4 | U | 1 |
| 9. | Headquarters of IMD is located at \_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 10. | According to planning commission, India is divided into \_\_\_\_\_\_\_ agroclimatic zones. | | CO5 | U | 1 |
| 11. | Expand IITM. | | CO5 | R | 1 |
| 12. | Which atmospheric layer is known as ‘seat of weather phenomenon’? | | CO1 | R | 1 |
| 13. | In , composition of gases in atmosphere is not uniform. | | CO1 | R | 1 |
| 14. | Relative humidity is less at high temperature. (True/False) | | CO2 | A | 1 |
| 15. | List out the types of breeze. | | CO3 | U | 1 |
| 16. | India foodgrains production is related to all India drought (True/False) | | CO6 | R | 1 |
| 17. | \_\_\_\_\_\_\_\_is the main crop season in India. | | CO4 | A | 1 |
| 18. | The role of ozone layer is\_\_\_\_\_\_\_\_ | | CO1 | A | 1 |
| 19. | Biotic stress is the major component in environmental stress. (True/False) | | CO6 | R | 1 |
| 20. | CO2 increase is not responsible for global warming. (True/False) | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Distinguish between weather and climate? | | CO1 | U | 5 |
| 22. | Describe (i) Drought, (ii) Floods, and (iii) Frost | | CO5 | R | 5 |
| 23. | Define (i) Sea breeze and (ii) Land breeze with neat diagram. | | CO2 | U | 5 |
| 24. | Explain about global warming. | | CO6 | A | 5 |
| 25. | Elucidate the different layers of atmosphere. | | CO1 | U | 5 |
| 26. | Define (i) Rain and (ii) Snow | | CO2 | U | 5 |
| 27. | Define Ozone layer and its importance. | | CO4 | R | 5 |
| 28. | Write down the scope and importance of agrometeorology. | | CO3 | R | 5 |
| 29. | Draw a diagram of the distribution of atmospheric pressure over the globe. | | CO5 | U | 5 |
| 30. | Explain the different agroclimatic zones of Tamil Nadu. | | CO1 | U | 5 |
| 31. | List down the different types of weather forecasting and write down their validity period. | | CO3 | A | 5 |
| 32. | Write about the cloud seeding and its types. | | CO4 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write in detail about different droughts. | CO4 | R | 8 |
|  | b. | List the different forms of precipitation and explain any two in detail. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain about the global wind distribution with neat diagram. | CO5 | U | 8 |
|  | b. | Define (i) Agricultural meteorology (ii) Bimodal rainfall (iii) Ozone depletion. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Enumerate in detail the northeast monsoon. | CO2 | A | 8 |
|  | b. | Explain about Aphelion and Perihelion with a neat diagram. | CO1 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the significance of agricultural meteorology, climate and weather. |
| CO2 | Know the various atmospheric weather variables and its significance in crop production |
| CO3 | Perceive crop weather relationships for efficient crop production |
| CO4 | Acquire knowledge on weather forecasting techniques |
| CO5 | Gains hands-on knowledge on the functioning of agro-meteorological observatory |
| CO6 | Address the effect of climate change on crop production |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 22 | 1 | - | - | - | 27 |
| CO2 | 1 | 11 | 9 | - | - | - | 21 |
| CO3 | 6 | 15 | 5 | - | - | - | 26 |
| CO4 | 14 | 1 | 6 | - | - | - | 21 |
| CO5 | 7 | 16 | - | - | - | - | 23 |
| CO6 | 2 | - | 5 | - | - | - | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG1303** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL MICROBIOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | **COs** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | |
| 1. | Who disproved abiogenesis? | CO1 | R | 1 |
| 2. | What are the inventions of Louis Pasteur? | CO1 | U | 1 |
| 3. | Study of algae is known as………… | CO4 | R | 1 |
| 4. | Define thermophiles. Give an example | CO2 | A | 1 |
| 5. | The symbiont harboured in the dorsal leaves of *Azolla* species, which aids in N fixation is…………. | CO3 | U | 1 |
| 6. | What are mycoplasmas? | CO2 | R | 1 |
| 7. | Define fermentation. | CO5 | A | 1 |
| 8. | Define oxidative phosphorylation. | CO2 | An | 1 |
| 9. | Who is the father of soil microbiology? | CO1 | R | 1 |
| 10. | Entner-Doudoroff pathway is most common in ……………bacteria. | CO3 | U | 1 |
| 11. | List out the factors affecting bacterial growth. | CO4 | U | 1 |
| 12. | What is the generation time of bacteria? | CO1 | R | 1 |
| 13. | Define recombinant DNA. | CO4 | R | 1 |
| 14. | Define transposons. | CO5 | U | 1 |
| 15. | What is mycorrhiza? | CO4 | R | 1 |
| 16. | Name the key enzyme for biological nitrogen fixation. | CO4 | E | 1 |
| 17. | Define disinfectant with an example. | CO6 | R | 1 |
| 18. | What is the effect of PSB on plant growth? | CO5 | R | 1 |
| 19. | Define antibiosis. | CO4 | U | 1 |
| 20. | Legume plants fix and utilize N by working symbiotically with………….. | CO4 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | |
| 21. | Describe the bacterial growth curve with illustrations. | CO1 | An | 5 |
| 22. | Differentiate bacteria and archaeabacteria. | CO2 | E | 5 |
| 23. | How can we distinguish gram negative and gram positive bacteria? | CO1 | E | 5 |
| 24. | Explain the types of bacteria classified based on oxygen requirement. | CO2 | A | 5 |
| 25. | Describe lac operon concept with suitable diagram. | CO5 | E | 5 |
| 26. | What are the contributions of Robert Koch in the field of microbiology? | CO1 | U | 5 |
| 27. | Explain the production and uses of biogas. | CO6 | E | 5 |
| 28. | Summarize the nutritional requirements of bacteria. | CO3 | E | 5 |
| 29. | Briefly explain the different phases of silage making. | CO6 | A | 5 |
| 30. | Give the major examples of biofertilizers and their target crops. | CO4 | U | 5 |
| 31. | Explain the mechanism of action of the biopesticides *Bacillus thuringiensis* | CO5 | U | 5 |
| 32. | Substantiate the need of biofertilizers in agriculture. | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | |
| 33. | Explain generalized and specialized transduction. | CO5 | An | 15 |
| 34. | Describe the genetics of nodulation and nitrogen fixation in leguminous plants. | CO4 | An | 15 |
| 35. | Describe the different types of biofertilizers and its uses. | CO4 | E | 15 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Comprehend the importance and role of microbes in agricultural production |
| CO2 | Understand principles of microscopy, sterilization techniques and nutrient media  preparation |
| CO3 | Enumerate microbial load in soil and perform isolation, culturing and purification of  microbes |
| CO4 | Explain the role of microbes in enhancing soil fertility |
| CO5 | Employ genetic transformation methods using microbes in crop improvement |
| CO6 | Explore and develop biofertilizers, biopesticides and biofuels |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 6 |  | 5 | 5 |  | 19 |
| CO2 | 1 |  | 6 | 1 | 5 |  | 13 |
| CO3 |  | 2 |  |  | 5 |  | 7 |
| CO4 | 3 | 7 | 1 | 15 | 16 |  | 42 |
| CO5 | 1 | 6 | 1 | 15 | 5 |  | 28 |
| CO6 | 1 |  | 5 | 5 | 5 |  | 16 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1351** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF PLANT PATHOLOGY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Give an example of myceliogenous sclerotia. | | CO3 | U | 1 |
| 2. | Non motile spores are termed as --------------------. | | CO3 | R | 1 |
| 3. | Name the organ of absorbtion of fungal pathogen. | | CO3 | An | 1 |
| 4. | Write the sexual fruiting body of powdery mildew pathogen. | | CO3 | A | 1 |
| 5. | Zinc deficiency in rice causes ---------------disease. | | CO1 | R | 1 |
| 6. | The sporangia of *Albugo* is attached with each other by -----------------. | | CO3 | R | 1 |
| 7. | The flagellum of zoospores are attached to the basal granule called----------. | | CO3 | R | 1 |
| 8. | Example of naked asci producing plant pathogen----------------. | | CO3 | U | 1 |
| 9. | Name any two phanerogamic parasites. | | CO2 | R | 1 |
| 10. | Cite an example of a pathogen with paragynous anthredia. | | CO3 | U | 1 |
| 11. | Who is considered as Father of Virology? | | CO1 | R | 1 |
| 12. | Gene for gene hypothesis was put forth by---------------- | | CO1 | R | 1 |
| 13. | How do plant pathogenic bacteria reproduce? | | CO3 | U | 1 |
| 14. | Report any two bacterial diseases affecting crops. | | CO1 | A | 1 |
| 15. | Cite two examples of virus diseases with their transmitting vector. | | CO2 | R | 1 |
| 16. | Explain the dispersal of plant pathogens. | | CO4 | U | 1 |
| 17. | Recall any one phytoharmone along with the disease name which causes deformities. | | CO1 | R | 1 |
| 18. | The toxins produced by *Alternaria* and *Fusarium* are respectively ----- and ----. | | CO4 | R | 1 |
| 19. | Classify antibiotics and cite examples. | | CO6 | An | 1 |
| 20. | Recommend a fungal and bacterial antagonist against plant diseases. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | How do the fungal pathogens infecting crops reproduce asexually? | | CO3 | U | 5 |
| 22. | Sketch the sporangial branching of downy mildew pathogens. | | CO3 | A | 5 |
| 23. | Write the general characters of *Oomycota* citing examples | | CO2 | A | 5 |
| 24. | Explain the formation of ascospores by crozier formation. | | CO3 | U | 5 |
| 25. | Differentiate the characters of *Rhizopus* and *Mucor* | | CO2 | An | 5 |
| 26. | Explain primary, secondary and tertiary mycelium. | | CO3 | A | 5 |
| 27. | Write the taxonomy for the following five plant pathogens  *Pythium*,*Sclerospora* ,*Taphrina* ,*Erysiphe* and *Claviceps* | | CO2 | R | 5 |
| 28. | List down any 5 type of symptoms produced by the plant viruses citing examples. | | CO2 | R | 5 |
| 29. | How do the plants defend themselves against diseases? | | CO5 | U | 5 |
| 30. | Classify plant diseases as per the geographic distribution. | | CO1 | An | 5 |
| 31. | Explain the mode of action of fungal biocontrol agent against plant pathogens. | | CO6 | An | 5 |
| 32. | Define the following  Rhizoids,Rhizomorph, Heterothallism ,Acervuli and Pycndia. | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the diagnostic symptoms produced by club root of cabbage and draw the life cycle. | CO2 | An | 7 |
|  | b. | Indicate the five types of spores produced by rust pathogen. Draw the life cycle of wheat rust bringing out its heteroecious nature. | CO3 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Indicate the general characters of *Erysiphaceae* and bring out the difference between the three types of powdery mildews. | CO2 | U | 7 |
|  | b. | How can the plant diseases managed through physical and cultural methods? | CO6 | A | 8 |
|  |  |  |  |  |  |
| 35. | a. | Where is the Directorate of Plant Protection ,Quarantine and Storage located. Summarize Plant Quarantine and its importance. | CO6 | R | 7 |
|  | b. | Classify the fungicides as per the translocation in the plants and elaborate copper and sulphur fungicides. | CO6 | An | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Remember the factors responsible for disease development |
| CO2 | Understand the importance of different plant pathogens with their characteristics and classification |
| CO3 | Recall the reproduction, survival and transmission of plant pathogens |
| CO4 | Outline the mode of dispersal, role of enzymes and toxins in disease development |
| CO5 | Analyze defense mechanism in plants and the epidemiological factors |
| CO6 | Apply knowledge on plant disease management |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | - | 1 | 5 | - | - | 10 |
| CO2 | 12 | 7 | 5 | 12 | - | - | 36 |
| CO3 | 3 | 27 | 11 | 1 | - | - | 42 |
| CO4 | 1 | 1 | - | - | - | - | 2 |
| CO5 | 5 | - | - | - | - | - | 5 |
| CO6 | 8 | - | 8 | 14 | - | - | 30 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1451** | **Duration** | **3hrs** |
| **Course Name** | **INTRODUCTORY SOIL AND WATER CONSERVATION ENGINEERING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is Geological erosion? | | CO1 | U | 1 |
| 2. | Write total area affected by erosion in India. | | CO1 | R | 1 |
| 3. | Define rill erosion. | | CO2 | An | 1 |
| 4. | What is a Standard USLE plot? | | CO3 | A | 1 |
| 5. | What are the major rainfall characteristics influencing runoff from watersheds? | | CO3 | E | 1 |
| 6. | Compute the kinetic energy of a rainstorm for an rainfall intensity of 1.25 cm/hr. | | CO3 | C | 1 |
| 7. | Define RUSLE. | | CO3 | U | 1 |
| 8. | Distinguish between active gully and inactive gully. | | CO2 | R | 1 |
| 9. | Define threshold velocity of wind. | | CO5 | A | 1 |
| 10. | Define surface creep in wind erosion. | | CO5 | An | 1 |
| 11. | What are the major tree species introduced to control wind erosion? | | CO6 | A | 1 |
| 12. | Distinguish between suspended load and Bed load movements. | | CO2 | U | 1 |
| 13. | Differentiate between wind breaks and shelter belts. | | CO6 | R | 1 |
| 14. | What are the surface roughness factors influencing soil erosion by wind? | | CO5 | An | 1 |
| 15. | What are the various causes of soil degradation? | | CO2 | A | 1 |
| 16. | Distinguish between contour strip cropping and buffer strip cropping systems. | | CO2 | U | 1 |
| 17. | What is mulch tillage? How does it influence soil erosion? | | CO2 | C | 1 |
| 18. | What are the common types of bench terraces? | | CO3 | R | 1 |
| 19. | Differentiate between contour bund and graded bund. | | CO4 | U | 1 |
| 20. | Where is contour stone wall construction adopted? | | CO2 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss various stages of gully development with neat sketches. | | CO2 | An | 5 |
| 22. | Compute the annual soil loss by using USLE for the following data:  Erosion index =250J/ha; contour cultivated area; Length of the field = 110 metres; Slope of the field = 5%; 65% silt + very fine stand; 5% sand; 3% organic matter; very fine granular structure; moderate permeability; Crop management factor = 0.35 and Conservation practice factor =0.5. | | CO3 | E | 5 |
| 23. | How are gullies classified? Discuss. | | CO2 | U | 5 |
| 24. | What are the permanent gully control structures? Explain anyone with a neat sketch. | | CO4 | R | 5 |
| 25. | Discuss about ill effects of soil erosion. | | CO2 | A | 5 |
| 26. | Brief about agronomical measures to control soil erosion. | | CO1 | C | 5 |
| 27. | Explain the step wise procedure to be followed in the design of contour bunds. | | CO4 | E | 5 |
| 28. | Briefly explain the mechanics of soil erosion by water. | | CO3 | C | 5 |
| 29. | Explain the stepwise procedure for estimating soil erosion by wind. | | CO5 | E | 5 |
| 30. | Discuss about wind erosion measures with neat sketches. | | CO6 | An | 5 |
| 31. | Explain the various water harvesting techniques with neat sketches. | | CO4 | A | 5 |
| 32. | Explain the step wise procedure to be followed in the design of grassed waterways. | | CO4 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss in detail the temporary gully control measures with neat sketch. | CO2 | E | 8 |
|  | b. | Explain the various factors affecting soil erosion by wind. | CO5 | C | 7 |
| 34. | a. | Describe with neat sketches of bench terraces adopted in the hilly regions. | CO1 | R | 8 |
|  | b. | Design a 150 m long bench terrace for a land having an average slope of 20%. The soil is clay loam. The terrace channel has a uniform grade of 0.5%. Maximum intensity of rainfall expected during the 10 year recurrence interval is 10cm/hr. | CO1 | U | 7 |
| 35. | a. | Explain with neat sketches about sediment samplers used for measuring soil loss. | CO3 | A | 8 |
|  | b. | Discuss about the different forms of water erosion with neat sketches. | CO1 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | 1. Understand basic concepts of soil and water conservation |
| CO2 | 1. Explain the gully erosion control measures |
| CO3 | 1. Measure the soil loss using different techniques |
| CO4 | 1. Explain the water harvesting techniques |
| CO5 | 1. Understand the mechanics of wind erosion |
| CO6 | 1. Explain the different control measures of wind erosion |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 9 | 8 | 0 | 7 | 0 | 5 | 29 |
| CO2 | 1 | 7 | 7 | 6 | 8 | 1 | 30 |
| CO3 | 1 | 1 | 9 | 0 | 11 | 1 | 23 |
| CO4 | 5 | 1 | 5 | 0 | 10 | 0 | 21 |
| CO5 | 0 | 0 | 1 | 2 | 5 | 7 | 15 |
| CO6 | 1 | 0 | 1 | 5 | 0 | 0 | 07 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG1501** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is a transgenic Plant? | | CO6 | R | 1 |
| 2. | Define meristem. | | CO4 | R | 1 |
| 3. | Classification of protein amino acids. | | CO1 | U | 1 |
| 4. | Define Carbohydrate. | | CO1 | R | 1 |
| 5. | List the mechanism of ATP formation. | | CO3 | U | 1 |
| 6. | Define Biochemistry. | | CO5 | R | 1 |
| 7. | Define cybrids. | | CO5 | R | 1 |
| 8. | Expand PUFA. | | CO1 | U | 1 |
| 9. | What is Reichert-Meisel number (R.H.Number)? | | CO5 | U | 1 |
| 10. | Define totipotency. | | CO3 | R | 1 |
| 11. | Define Enzymes. | | CO1 | R | 1 |
| 12. | Write the Factors affecting the success of embryo culture. | | CO3 | R | 1 |
| 13. | What are Inhibitors? | | CO2 | R | 1 |
| 14. | Expand PCR and DNA. | | CO4 | U | 1 |
| 15. | What are the enzymes involved in DNA replication? | | CO6 | R | 1 |
| 16. | What is cryopreservation? | | CO4 | R | 1 |
| 17. | What is lipid? | | CO2 | R | 1 |
| 18. | Who is the father of micropropagation? | | CO1 | A | 1 |
| 19. | What is recombinant DNA? | | CO2 | R | 1 |
| 20. | What is Marker Assisted Breeding? | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the application in another culture. | | CO1 | R | 5 |
| 22. | Classify Enzymes. | | CO4 | U | 5 |
| 23. | Write briefly about the Significance of glycolysis. | | CO3 | R | 5 |
| 24. | Explain the three types of lipid aggregates in water. | | CO6 | U | 5 |
| 25. | Discuss different types of DNA. | | CO6 | U | 5 |
| 26. | Explain the Procedure for the meristem culture. | | CO4 | A | 5 |
| 27. | What is Michaelis - Menten constant? Write its significance. | | CO2 | A | 5 |
| 28. | What is protoplast fusion? Explain the different methods of protoplast fusion. | | CO2 | A | 5 |
| 29. | Explain the chemical Properties of Fat. | | CO5 | U | 5 |
| 30. | Write the Stages of Micropropagation. | | CO6 | R | 5 |
| 31. | Discuss the Metabolic processes in carbohydrates. | | CO3 | U | 5 |
| 32. | Explain the different types of RNA. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Give a detailed account of the Agrobacterium-mediated gene transfer method. | CO5 | A | 7.5 |
|  | b. | Explain the steps involved in the ovule culture technique & its applications. | CO1 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What is a DNA Marker? Describe the procedure of the RFLP marker. | CO3 | R | 7.5 |
|  | b. | Explain the steps involved in tricarboxylic acid (TCA). | CO4 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Classify Phospholipases. | CO6 | U | 7.5 |
|  | b. | Give a detailed account of the mechanism of DNA in DNA replication. | CO3 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the importance of biomolecules in medicine, agriculture, pharmaceuticals, and ethics |
| CO2 | Remember the structure and classification of biomolecules |
| CO3 | Recall the role of biomolecules in photosynthesis, protein synthesis, and DNA synthesis |
| CO4 | Remember the developments in biochemistry |
| CO5 | Explain the overall aspects of the integration of metabolic processes |
| CO6 | Apply the knowledge on the structure of carbohydrates, proteins, vitamins, nucleic acids, and lipids in drug discovery |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 3 | 8.5 | - | - | - | 18.5 |
| CO2 | 4 |  | 10 | - | - | - | 14 |
| CO3 | 22 | 11 |  | - | - | - | 33 |
| CO4 | 2 | 13.5 | 5 | - | - | - | 20.5 |
| CO5 | 2 | 5 | 7.5 | - | - | - | 14.5 |
| CO6 | 7 | 17.5 |  | - | - | - | 24.5 |
|  | | | | | | | **125** |



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| **Course Code** | **FUNDAMENTALS OF CROP PHYSIOLOGY** | **Duration** | **3hrs** |
| **Course Name** | **21AG1503** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Hen and chicken disorder in grapes is caused due to ……………. deficiency | | CO3 | R | 1 |
| 2. | ………………. Helps in post translational modification of proteins | | CO1 | R | 1 |
| 3. | Unit layer of vacuole is called as………………….. | | CO1 | R | 1 |
| 4. | ………is the measure of available photosynthetic surface per unit land area. | | CO5 | R | 1 |
| 5. | The upward movement of water is called …………………. | | CO2 | R | 1 |
| 6. | …………….. is called the stress hormone | | CO6 | R | 1 |
| 7. | The available water potential range is ………….. | | CO2 | R | 1 |
| 8. | The formula for Crop Growth rate is …………….. | | CO5 | R | 1 |
| 9. | The enzyme that carboxylates RuBP is ………………. | | CO4 | R | 1 |
| 10. | Whiptail in cauliflower is caused due to………….. deficiency | | CO3 | R | 1 |
| 11. | Guttation occurs through……………. | | CO2 | R | 1 |
| 12. | The first CO2 acceptor in C3 plants is…………… | | CO4 | R | 1 |
| 13. | Phosphorylation during cellular respiration is called as………………. | | CO4 | R | 1 |
| 14. | …………………. discovered auxin | | CO6 | R | 1 |
| 15. | Delay in senescence by cytokinin is called as …………….. effect | | CO6 | R | 1 |
| 16. | The biosynthetic inhibitor of ethylene is ………………. | | CO6 | R | 1 |
| 17. | Give one anti transpirants | | CO2 | R | 1 |
| 18. | The breakdown of fatty acid is called as……….. | | CO4 | R | 1 |
| 19. | TCA cycle is also called as………………. | | CO4 | R | 1 |
| 20. | Movement of water from higher concentration to lower concentration through semi permeable membrane is called as…………. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the structure and function of nucleus. | | CO1 | U | 5 |
| 22. | Discuss the types of transporters in nutrient uptake. | | CO3 | U | 5 |
| 23. | Distinguish primary and secondary cell wall. | | CO1 | U | 5 |
| 24. | Describe Ethylene biosynthetic pathway. | | CO6 | U | 5 |
| 25. | State the commercial use of Gibberelic acid. | | CO6 | U | 5 |
| 26. | Elaborate the CAM pathway. | | CO4 | U | 5 |
| 27. | Discuss the different pathway of water movement in plants. | | CO2 | U | 5 |
| 28. | Distinguish between oxidative and photo phosphorylation. | | CO4 | U | 5 |
| 29. | Discuss Electron transport chain in mitochondria. | | CO4 | U | 5 |
| 30. | Describe any two growth parameters. | | CO5 | U | 5 |
| 31. | Discuss the keys to identify deficiency symptoms in plants. | | CO3 | U | 5 |
| 32. | Explain the starch -sugar interconversion theory of stomatal opening and closing. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the light and dark reactions of photosynthesis in C3 plants. | CO4 | U | 8 |
|  | b. | Discuss the critical stages of growth in rice. | CO5 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the biosynthetic pathway of cytokinin. | CO6 | U | 8 |
|  | b. | Describe the practical application of plant growth regulators. | CO6 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the role and deficiency symptoms of micro nutrients. | CO3 | U | 10 |
|  | b. | Define Stomata, Guttation and Permanent wilting point. | CO2 | U | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the physiology of plant tissues and cells |
| CO2 | Remember water movement in plant systems like diffusion and osmosis |
| CO3 | Apply the concept of water relations, mineral uptake in the field of agriculture |
| CO4 | Summarize the various physiological processes |
| CO5 | Measure and analyze the physiological parameters of crops |
| CO6 | Practice the use of growth regulators correctly to solve physiological problems |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 10 | - | - | - | - | 12 |
| CO2 | 5 | 16 | - | - | - | - | 21 |
| CO3 | 2 | 20 | - | - | - | - | 22 |
| CO4 | 5 | 23 | - | - | - | - | 28 |
| CO5 | 2 | 12 | - | - | - | - | 20 |
| CO6 | 4 | 20 | - | - | - | - | 24 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2004** | **Duration** | **3hrs** |
| **Course Name** | **CROP PRODUCTION TECHNOLOGY - I (KHARIF CROPS)** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define aflatoxin. | | CO1 | R | 1 |
| 2. | Describe Anti nutritional in millets. | | CO2 | U | 1 |
| 3. | What are the growth stage of rice? | | CO1 | R | 1 |
| 4. | Define earthing up. | | CO3 | R | 1 |
| 5. | Write about seed treatment. | | CO2 | R | 1 |
| 6. | What is the major problem in cotton? | | CO2 | R | 1 |
| 7. | Listout the suitable varieties of soybean. | | CO4 | R | 1 |
| 8. | Define Seed drill. | | CO3 | R | 1 |
| 9. | List out the economic importance of pulses. | | CO3 | R | 1 |
| 10. | Define nursery and its types. | | CO1 | R | 1 |
| 11. | What are the types of seed treatment? | | CO5 | R | 1 |
| 12. | What is the dibbling method? | | CO4 | R | 1 |
| 13. | Discuss about soil and climatic requirement of rice. | | CO4 | R | 1 |
| 14. | What is the protein value of maize? | | CO2 | R | 1 |
| 15. | Which is the most important method of rice cultivation in India? | | CO3 | R | 1 |
| 16. | Show the critical steps in SRI. | | CO3 | U | 1 |
| 17. | Name the commercial grown species of cotton. | | CO5 | R | 1 |
| 18. | What is forage crops and its types? | | CO2 | R | 1 |
| 19. | Define cotton ginning and its types. | | CO3 | R | 1 |
| 20. | Write the soil type pigeon pea. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain about the rice nursery preparation. | | CO2 | U | 5 |
| 22. | Describe about the economic important and unique characters of blackgram. | | CO3 | U | 5 |
| 23. | Discuss about the application fertilizer and manure on pigeonpea cultivation. | | CO4 | U | 5 |
| 24. | Write about the role and importance of pulse crops in Indian agriculture. | | CO5 | R | 5 |
| 25. | Describe about the cultural practices done in maize. | | CO3 | U | 5 |
| 26. | Explain about HCN Poisoning in Sorghum fodder. | | CO3 | U | 5 |
| 27. | Identify how the sulphur fertilizer enhance oilseed productivity. | | CO6 | A | 5 |
| 28. | Distinguish sowing method and spacing of groundnut cultivation. | | CO2 | U | 5 |
| 29. | Identify the fertilizer requirement and weed management practices in jute. | | CO3 | A | 5 |
| 30. | Show the reason for bad boll opening in cotton. | | CO6 | A | 5 |
| 31. | What are the characteristics features of puddling. | | CO4 | R | 5 |
| 32. | Explain about transplantation and its advantages. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Briefly explain about **manure as an organic fertilizer.** | CO5 | U | 7.5 |
|  | b. | Explain about minimize the post-harvest losses of groundnut. | CO6 | U | 7.5 |
| 34. | a. | Enlist the reasons for low yield of groundnut in India. | CO3 | R | 7.5 |
|  | b. | Explain the types and classification of jute fiber. | CO3 | U | 7.5 |
| 35. | a. | Briefly explain the practices of crop production. | CO5 | U | 7.5 |
|  | b. | What are the reason causes of low pulse productivity in India? Give the suggestion for improving pulse production. | CO6 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the crop production technology for *kharif* crops |
| CO2 | Gain knowledge on geographical distribution of *kharif* crops |
| CO3 | Recall the morphological features and crop production requirements for kharif season crops |
| CO4 | Remember soil and climatic requirements of different *kharif* crop varieties |
| CO5 | Acquire the knowledge on crop management practices for *kharif* season |
| CO6 | Apply the acquired knowledge to guide the farmers for cultivating *kharif* crops |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | **-** | **-** | **-** | **-** | **-** | 3 |
| CO2 | 4 | 16 | **-** | **-** | **-** | **-** | 20 |
| CO3 | 12.5 | 23.5 | 5 | **-** | **-** | **-** | 41 |
| CO4 | 9 | 5 | **-** | **-** | **-** | **-** | 14 |
| CO5 | 7 | 15 | **-** | **-** | **-** | **-** | 22 |
| CO6 | 7.5 | 7.5 | 10 | **-** | **-** | **-** | 25 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2005** | **Duration** | **3hrs** |
| **Course Name** | **CROP PRODUCTION TECHNOLOGY – 1I (RABI CROPS)** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The first semi dwarf spring wheat developed in the world is ------------------ . | | CO1 | R | 1 |
| 2. | Barley type with high protein content best suited for human consumption is  ---------------- . | | CO1 | R | 1 |
| 3. | Most important critical growth stage for irrigation of wheat is ----------------- | | CO2 | U | 1 |
| 4. | Pendimethalin commonly used for weed control in pulse crops is a ------------  emergence herbicide. | | CO4 | An | 1 |
| 5. | Raya, Laha, Rai are local names of ---------------------- crop. | | CO2 | R | 1 |
| 6. | Lentil is grown in India during ------------- season. | | CO2 | U | 1 |
| 7. | Among rapeseed and mustard, the species cultivated in 75-80 % area in India is ---------------------- . | | CO1 | U | 1 |
| 8. | The seed rate recommended for rapeseed and mustard for pure crop is ------------ kg /ha. | | CO5 | An | 1 |
| 9. | Oil of rapeseed and mustard contains 41 to 57 % ------------ acid and hence not permitted for direct use in many countries. | | CO1 | A | 1 |
| 10. | In sunflower, the ------------------ florets mature into seeds. | | CO2 | A | 1 |
| 11. | Keeping bee hives at the rate of ------- numbers / ha improves seed setting in sunflower. | | CO4 | C | 1 |
| 12. | The number of two budded setts of sugarcane required for planting in one hectare is ------------------------ . | | CO5 | An | 1 |
| 13. | Among the Indian states ---------------- has the highest productivity of sugarcane. | | CO1 | An | 1 |
| 14. | ------------------ number of buds are to be planted in one meter length when sugarcane setts are planted end to end in furrows. | | CO5 | An | 1 |
| 15. | The recommended spacing for planting single budded chip seedlings of sugarcane under SSI method is ------ x --------- feet. | | CO5 | R | 1 |
| 16. | After the harvest of plant crop of sugarcane, stubbles sprout and gives rise to a succeeding crop called ------------- crop. | | CO5 | R | 1 |
| 17. | Lemon grass was originated in --------------------- country. | | CO5 | R | 1 |
| 18. | Mentha is also known as -----------------. | | CO5 | R | 1 |
| 19. | Vegetative matter, fresh or preserved, utilized as feed for animals is known as ----------------------------- . | | CO2 | U | 1 |
| 20. | King of fodder crops is ---------------------------- . | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the wheat growing zones of India. | | CO1 | An | 5 |
| 22. | Explain in detail about the differences and uses of two and six row barleys. | | CO3 | A | 5 |
| 23. | Distinguish between Desi and Kabuli types of Bengal gram. | | CO2 | E | 5 |
| 24. | Explain the soil and climatic requirements, sowing time, seed rate and method of sowing of lentil in India. | | CO2 | An | 5 |
| 25. | Explain the species of rapeseeds and mustards grown in India. | | CO2 | R | 5 |
| 26. | Distinguish between mustard and rapeseed. | | CO4 | E | 5 |
| 27. | Explain the various methods to improve seed set in sunflower. | | CO4 | A | 5 |
| 28. | Explain the various steps of chip bud nursery preparation of sugarcane. | | CO5 | C | 5 |
| 29. | Explain the various methods of planting sugarcane. | | CO5 | E | 5 |
| 30. | Name the parasitic weed found in sugarcane fields and explain how to control it. | | CO6 | E | 5 |
| 31. | Explain the agrotechniques of lemon grass cultivation in India. | | CO5 | U | 5 |
| 32. | Mention the major fodder crops cultivated during rabi season in India and the importance of fodder crops in agriculture. | | CO2 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Give a brief account of various harvesting and processing methods of wheat in India. | CO3 | E | 8 |
|  | b. | What are the different value added products of wheat in India and mention the harmful effect of continuous use of maida products. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the annual requirement, production and import of edible vegetable oil in India. Write the botanical name and importance of sunflower in India. | CO1 | R | 8 |
|  | b. | Write in detail about the major fodder production systems in India. | CO2 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Define ratooning. Explain the management practices for ratoon sugarcane. | CO5 | An | 8 |
|  | b. | Write a short note on sugarcane by products derived from sugar industry and their uses. | CO1 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **COURSE OUTCOMES** | | | | | | | |
| CO1 | Understand the economic importance of Rabi crops | | | | | | | |
| CO2 | Know the agro-ecological requirements for Rabi crop production | | | | | | | |
| CO3 | Apply cultural practices and post harvest technology for Wheat and Barley | | | | | | | |
| CO4 | Apply cultural practices and post harvest technology for oilseeds and pulses | | | | | | | |
| CO5 | Apply cultural practices and post harvest technology of sugarcane and medicinal crops | | | | | | | |
| CO6 | Be aware of the innovations and research advancements in Rabi crop production | | | | | | | |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | | |
| **CO / P** | | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | | 10 | 8 | 1 | 6 |  | 7 | 32 |
| CO2 | | 7 | 3 | 8 | 10 | 5 |  | 33 |
| CO3 | |  |  | 5 |  | 8 |  | 13 |
| CO4 | |  |  | 5 | 1 | 5 | 1 | 12 |
| CO5 | | 4 | 5 |  | 11 | 5 | 5 | 30 |
| CO6 | |  |  |  |  | 5 |  | 5 |
|  | | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2006** | **Duration** | **3hrs** |
| **Course Name** | **FARMING SYSTEMS & SUSTAINABLE AGRICULTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The cultivation of trees for fruit, gums *etc*., is called as ------------- | | CO1 | R | 1 |
| 2. | The New Zealand white is the important breed for --------. | | CO4 | R | 1 |
| 3. | List out the benefits of catch crops. | | CO1 | U | 1 |
| 4. | Define farming system. | | CO3 | R | 1 |
| 5. | The goat is one of the major components in wet land IFS model. (True / False). | | CO4 | U | 1 |
| 6. | Sowing of crops without any preparatory cultivation is known as -------- tillage. | | CO1 | R | 1 |
| 7. | Legumes extracts insoluble P and returns as available P to the succeeding crop and hence P requirement of next crop can be reduced by ----------------- %. | | CO1 | An | 1 |
| 8. | Relative land area under sole crop required to produce the same yield as obtained under a mixed or inter cropping system at the same level of management is known as -------------equivalent ratio. | | CO5 | U | 1 |
| 9. | ------------- gives a simple measure of how much the relative yield increase in component ‘a’ is greater than that for component ‘b’ in intercropping. | | CO5 | C | 1 |
| 10. | The “Crop Equivalent Yield” is one of the indices for evaluate the land use. (True / False). | | CO5 | An | 1 |
| 11. | Define intercropping with example. | | CO2 | U | 1 |
| 12. | Expand ICAR – IIFSR. | | CO1 | R | 1 |
| 13. | Sowing the succeeding crops in the standing previous crop may be practiced without any land preparation refers to ------------. | | CO1 | U | 1 |
| 14. | The selection of proper time of sowing is comes under --------- input. | | CO6 | A | 1 |
| 15. | Define sequential cropping system. | | CO1 | R | 1 |
| 16. | Give the formula for calculating the Crop Equivalent Yield. | | CO5 | E | 1 |
| 17. | Define - Agri-silviculture. | | CO3 | R | 1 |
| 18. | The ratoon cropping is otherwise called as ------------ | | CO1 | R | 1 |
| 19. | Define row intercropping. | | CO1 | A | 1 |
| 20. | Differentiate the sorghum effect and cotton effect. | | CO2 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Give the suitable IFS models for wet land ecosystem. | | CO5 | A | 5 |
| 22. | Explain the complementary and competitive interaction in different cropping system. | | CO2 | U | 5 |
| 23. | Discuss about the agronomic requirement for water management in various cropping system approach. | | CO3 | A | 5 |
| 24. | Give the Indices for economic evaluation for the scientific farm management. | | CO6 | E | 5 |
| 25. | Write about the allied enterprises for limited water available ecosystem. | | CO4 | U | 5 |
| 26. | Define multiple cropping and list out the different forms or types of multiple cropping. | | CO3 | U | 5 |
| 27. | Write about the important cropping system followed in Tamil Nadu. | | CO1 | U | 5 |
| 28. | Differentiate between conventional agriculture and conservation agriculture. | | CO3 | A | 5 |
| 29. | Explain about modern concept of tillage. | | CO2 | A | 5 |
| 30. | Differentiate the cropping system and cropping pattern. | | CO2 | U | 5 |
| 31. | Define CII and calculate the following  A farm having a cultivable area of 3 ha and growing Rice-Pulse system in field 1, Rice-Rice-Pulse system in field 2 and sugarcane in field 3. Calculate the CII of the farm and give your inference | | CO5 | E | 5 |
| 32. | Write about the agronomic requirements for nutrient management in various cropping system approaches. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. |  | Develop a suitable IFS model for dry land ecosystem of Tamil Nadu and indicate the economic advantages through suitable illustration. | CO4 | C | 15 |
| 34. | a. | Define IFS and explain about its advantages in various ecosystems with suitable examples. | CO5 | C | 7 |
|  | b. | Briefly explain about soil fertility management in cropping system. | CO6 | An | 8 |
| 35. | a. | Explain in detail about LEISA concept with suitable examples. | CO2 | C | 7 |
|  | b. | Discuss about resource recycling and explain about resource recycling in various ecosystems. | CO6 | U | 8 |

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|  | COURSE OUTCOME |
| CO1 | Understand the different cropping and farming systems |
| CO2 | Differentiate the different types of farming and cropping systems |
| CO3 | Relate between sustainable agriculture and conventional agriculture |
| CO4 | Understand different concept and components of integrated farming systems management |
| CO5 | Understand the indicators in cropping, farming and integrated farming system |
| CO6 | Evaluation of cropping, farming and integrated farming system |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | Remember | Understand | Apply | Analyze | Evaluate | Create | Total |
| CO1 | 5 | 7 | 1 | 1 | - | - | 14 |
| CO2 | - | 16 | 6 | - | - | 7 | 29 |
| CO3 | 2 | 5 | 10 | - | - | - | 17 |
| CO4 | 1 | 6 | - | - | - | 15 | 22 |
| CO5 | - | 1 | 5 | 1 | 6 | 8 | 21 |
| CO6 | - | 8 | 1 | 8 | 5 | - | 22 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2012** | **Duration** | **3hrs** |
| **Course Name** | **WEED MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | ………………………. is the first herbicide produced in the world. | | CO1 | R | 1 |
| 2. | Scientific name of congress grass is ………………………………… | | CO4 | R | 1 |
| 3. | Define weed seed bank. | | CO2 | An | 1 |
| 4. | ……………..weeds mature and are harvested at the same time as crop seeds. | | CO1 | A | 1 |
| 5. | An example for a commercially available bioherbicde is …………. | | CO5 | U | 1 |
| 6. | Herbicides are rarely used in dust formulation due to ………………hazard. | | CO3 | A | 1 |
| 7. | The detrimental effect of one plant on another is known as ………………. | | CO3 | A | 1 |
| 8. | A herbicide that kills some species in a mixed growth plant species are termed as ……………………… | | CO3 | R | 1 |
| 9. | What is the role of antidode in herbicide usage?. | | CO2 | U | 1 |
| 10. | ……………is a total stem parasitic weed of tobacco. | | CO1 | R | 1 |
| 11. | Stale seed bed technique is a ……………..method of weed control. | | CO4 | A | 1 |
| 12. | …………………………………exhibits innate, induced and enforced dormancy. | | CO4 | An | 1 |
| 13. | *Cynodon dactylon* propagates through a) rhizomes b) runners c)stolons d) all of the above. | | CO3 | U | 1 |
| 14. | Define active ingredient in herbicides. | | CO3 | An | 1 |
| 15. | Mehyl bromide herbicide is used as a …………………………. | | CO3 | A | 1 |
| 16. | The herbicides applied 1-4 DAS is a ……………….type of herbicide. | | CO5 | U | 1 |
| 17. | Soil solarisation requires an increase of soil temperature by…………..to effectively kill weeds seeds in the surface layer. | | CO4 | R | 1 |
| 18. | Dredging and chaining are used to remove…………………..weeds. | | CO1 | A | 1 |
| 19. | Flooding is a ………………… method of weed control. | | CO4 | R | 1 |
| 20. | The trade name of Glyposhate is…………………………. | | CO1 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | What are some of the common methods of dispersal in weed seed propagation? | | CO1 | An | 5 |
| 22. | Classify and list the types of weeds in an aquatic environment. | | CO1 | An | 5 |
| 23. | How can allelopathy be used for weed control in crop plants? | | CO2 | E | 5 |
| 24. | What are adjuvants? Discuss the types of adjuvants found commonly in herbicides. | | CO3 | U | 5 |
| 25. | What are the mechanical/physical measures of weed control to be followed by a farmer? | | CO5 | A | 5 |
| 26. | Suggest ways to manage herbicide residues in soil. | | CO3 | An | 5 |
| 27. | Differentiate between selective and non-selective herbicides. | | CO3 | E | 5 |
| 28. | Classify herbicides by their method of application. | | CO3 | U | 5 |
| 29. | Differentiate between emulsifiable concentrate and granule formulations. | | CO3 | E | 5 |
| 30. | What is the purpose of : i) emulsifying agents and ii) surfactants. | | CO3 | A | 5 |
| 31. | Briefly explain the stale seed bed technique and soil solarization. | | CO5 | An | 5 |
| 32. | List the advantages of biological methods of weed control. | | CO5 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss about the Integrated Weed management approach for dealing with weeds in pulse crop. | CO1 | C | 7 |
|  | b. | What are some of the common herbicide formulations available in the market? | CO3 | E | 8 |
|  |  |  |  |  |  |
| 34. | a. | What is weed dormancy? List the types of dormancies and explain how each type help weeds survive and compete with crop plants. | CO2 | An | 8 |
|  | b. | What strategies would you follow to manage herbicide resistant weeds in your farm? | CO5 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | What are the cultural practices of weed control that will help a farmer control weeds in his farm? | CO6 | C | 10 |
|  | b. | You are a farmer planning to grow rice. Plan an Integrated Weed management approach for dealing with weeds in your field. | CO5 | E | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify different types of weeds and their ecosystem |
| CO2 | Understand the weeds survival mechanisms |
| CO3 | Recommend herbicides understanding their effects on the crops |
| CO4 | Adopt different weed control methods |
| CO5 | Apply integrated weed management practices |
| CO6 | Workout the economics of weed control in horticultural crops |

|  |  |  |  |  |  |  |  |
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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 |  | 2 | 11 |  | 7 | 22 |
| CO2 |  | 1 |  | 9 | 5 |  | 15 |
| CO3 | 1 | 11 | 8 | 6 | 18 |  | 44 |
| CO4 | 3 |  | 1 |  |  |  | 5 |
| CO5 | 5 | 2 | 12 | 5 | 5 |  | 29 |
| CO6 |  |  |  |  |  | 10 | 10 |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2012** | **Duration** | **3hrs** |
| **Course Name** | **WEED MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The most important weed associated with rice is\_\_\_\_\_ | | CO2 | U | 1 |
| 2. | Propagation of sedges is through\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Sedges belong to the family\_\_\_\_\_ | | CO1 | An | 1 |
| 4. | Cutting weeds to the ground level is known as \_\_\_\_\_ | | CO3 | A | 1 |
| 5. | Who invented the first animal-drawn weeding implement in 1731 named the horse hoe? | | CO1 | U | 1 |
| 6. | Phyllanthus niruri useful in treating \_\_\_\_\_ | | CO2 | R | 1 |
| 7. | National Research Centre for Weed Science is located at \_\_\_\_\_\_ | | CO1 | R | 1 |
| 8. | Water weeds are technically known as \_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 9. | These weeds require at least two seasons to complete their life cycle called \_\_\_\_\_\_\_\_ | | CO2 | An | 1 |
| 10. | Imazethapyr is an imidazole compound used as a selective post-emergence herbicide in \_\_\_\_\_\_\_\_\_\_. | | CO5 | C | 1 |
| 11. | Cotton, Sunflower, and cowpea are trap crops for\_\_\_\_\_\_ | | CO5 | E | 1 |
| 12. | Saline and alkaline condition growing weeds are called as \_\_\_\_\_\_\_\_. | | CO2 | U | 1 |
| 13. | The process of applying herbicides through irrigation is known as\_\_\_\_\_\_\_ | | CO5 | C | 1 |
| 14. | Which is the most widely used carrier for herbicide? | | CO5 | U | 1 |
| 15. | The competition between the plants of the same species which may be of crop or weed is called \_\_\_\_\_\_\_\_. | | CO4 | An | 1 |
| 16. | Which Herbicide tends only to those plant parts that come in direct contact? | | CO5 | A | 1 |
| 17. | First commercially used herbicide in the world \_\_\_\_\_\_\_\_. | | CO6 | U | 1 |
| 18. | Father of Allelopathy \_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 19. | Weed control measures taken prior to the entry of weed into the field is **\_\_\_\_\_\_** | | CO6 | An | 1 |
| 20. | Give an example for pre-plant soil incorporation Herbicide. | | CO3 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write about weed classification based on their lifespan with examples. | | CO1 | U | 5 |
| 22. | Enumerate characteristics of weeds. | | CO1 | A | 5 |
| 23. | Explain about Allelopathic effect of weeds on crops. | | CO3 | An | 5 |
| 24. | Discuss different types of Dissemination of weeds. | | CO6 | C | 5 |
| 25. | Define Allelopathy and explain about different types of Allelopathy. | | CO2 | U | 5 |
| 26. | Write about factors affecting the persistence of weed. | | CO6 | An | 5 |
| 27. | Explain about weed seed dormancy and types of dormancy. | | CO2 | R | 5 |
| 28. | Discuss Poisonous and Parasitic weeds with suitable examples. | | CO3 | U | 5 |
| 29. | Write about the critical period of crop-weed competition with examples. | | CO4 | E | 5 |
| 30. | Describe herbicide interaction with moisture and fertilizer. | | CO5 | An | 5 |
| 31. | Discuss on fate of soil-applied herbicides. | | CO5 | E | 5 |
| 32. | Explain about biological control of weeds with examples. | | CO4 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain different classification of weeds. | CO1 | U | 7.5 |
|  | b. | Write about crop weed competition. | CO2 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Elaborately discuss the classification of herbicides. | CO3 | C | 7.5 |
|  | b. | What is adjuvants and explain about different kind of adjuvants. | CO5 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Briefly discuss about management of herbicide residues in soil. | CO6 | E | 7.5 |
|  | b. | What is IWM? Write about IWM practices for transplanted rice and irrigated cotton crop. | CO4 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify and classify the weeds of terrestrial and aquatic ecosystems |
| CO2 | Understand the weeds of different agro-ecosystems and their impact on crops and cropping systems |
| CO3 | Formulate Integrated Weed Management Practices for various crops |
| CO4 | Formulate Integrated Weed Management Practices for various cropping systems |
| CO5 | Recommend various weed management practices to farmers |
| CO6 | Monitor and predict the occurrence and invasion of new weeds in different ecosystems |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 14.5 | 5 | 2 |  |  | 23.5 |
| CO2 | 7 | 6 |  | 8.5 |  |  | 21.5 |
| CO3 |  | 5 | 1 | 6 |  | 7.5 | 19.5 |
| CO4 |  |  |  | 13.5 | 5 |  | 18.5 |
| CO5 | 2 |  | 8.5 | 5 | 5 | 1 | 21.5 |
| CO6 |  | 2 |  | 6 | 7.5 | 5 | 20.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2052** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL FINANCE AND COOPERATION** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Agricultural finance. | | CO1 | U | 1 |
| 2. | What is Chattel loan? | | CO5 | R | 1 |
| 3. | List the Non – Non-institutional source of credit in India. | | CO2 | An | 1 |
| 4. | The 14 banks were nationalized on \_\_\_\_\_\_\_\_. | | CO2 | A | 1 |
| 5. | Expand NABARD. | | CO6 | E | 1 |
| 6. | List any 2 examples of specialized branches. | | CO1 | C | 1 |
| 7. | The service area approach was commenced on \_\_\_\_\_\_\_. | | CO3 | An | 1 |
| 8. | Define Microfinance. | | CO1 | R | 1 |
| 9. | RRB is sponsored by \_\_\_\_\_\_\_. | | CO5 | E | 1 |
| 10. | Define the scale of finance. | | CO1 | A | 1 |
| 11. | Define fixed cost. | | CO3 | U | 1 |
| 12. | Headquarters for Asian Development Bank is \_\_\_\_\_\_ | | CO3 | A | 1 |
| 13. | ------ is the form of security for the lender. | | CO2 | An | 1 |
| 14. | Define project. | | CO6 | C | 1 |
| 15. | Define discounting. | | CO4 | C | 1 |
| 16. | Write the formula for Net Capital Ratio. | | CO4 | E | 1 |
| 17. | Write the formula for Benefit Cost Ratio. | | CO4 | E | 1 |
| 18. | Define assets. | | CO4 | U | 1 |
| 19. | Expand SWOT. | | CO6 | R | 1 |
| 20. | Long-term credit was given by----- | | CO3 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write about the importance of Agricultural Finance. | | CO1 | R | 5 |
| 22. | Describe the Non-Institutional source of finance in India. | | CO3 | U | 5 |
| 23. | What are the functions of Commercial Bank? | | CO2 | An | 5 |
| 24. | Write about lead bank and its functions. | | CO3 | C | 5 |
| 25. | Write about the scale of finance and unit cost. | | CO1 | E | 5 |
| 26. | Elaborate on the principles of the 5 C’s for credit analysis. | | CO3 | An | 5 |
| 27. | Write about Income Statement? | | CO4 | A | 5 |
| 28. | Write about State Co-operative Banks. | | CO5 | R | 5 |
| 29. | Define the project and its content of a project. | | CO5 | U | 5 |
| 30. | Explain about types of Co-operative society. | | CO6 | A | 5 |
| 31. | Describe NAFED. | | CO2 | C | 5 |
| 32. | Define Cooperation and its principles. | | CO6 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write about RBI and its Functions. | CO3 | R | 8 |
|  | b. | Prepare the Bankable Project for the Agricultural sector. | CO4 | C | 7 |
|  |  |  |  |  |  |
| 34. | a. | Recent Development in Agricultural Credit? | CO1 | An | 9 |
|  | b. | Describe the Asian Development Bank. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 35. | a. | Write about the Concept, Organization, and Function of SHG. | CO6 | U | 9 |
|  | b. | List the advantages and disadvantages of sources of credit. | CO2 | E | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | COURSE OUTCOMES |
| CO1 | Understand the financial system in India. |
| CO2 | Apply principles of banking and credit appraisal procedure. |
| CO3 | Analyze credit and deposit services of private, public, and cooperative sector banks |
| CO4 | Prepare and analyze the Balance Sheet, Income, and Expenditure Statements of a business unit. |
| CO5 | Develop skills in credit analysis, dealing with bankers, and loan application procedures. |
| CO6 | Popularize farmer-friendly schemes of Crop insurance and Cooperative warehousing among farmers. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 1 | 1 | 9 | 5 | 1 | 23 |
| CO2 | - | - | 1 | 7 | 6 | 5 | 19 |
| CO3 | 8 | 6 | 3 | 6 | - | 5 | 28 |
| CO4 | - | 1 | 5 | - | 2 | 7 | 15 |
| CO5 | 6 | 5 | 6 | - | 1 | - | 18 |
| CO6 | 1 | 9 | 5 | - | 6 | 1 | 22 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2053** | **Duration** | **3hrs** |
| **Course Name** | **AGRICULTURAL MARKETING TRADE & PRICES** | **Max. Marks** | **100** |

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| **Q.**  **No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What are the two forces that determine the market prices? | | CO1 | U | 1 |
| 2. | Government of Tamil Nadu introduced the new concept in order to  eliminate the middlemen between farmers and consumers. | | CO2 | U | 1 |
| 3. | Which year Food Corporation of India was established---------------- | | CO5 | R | 1 |
| 4. | Name the market in which goods are exchanged for money immediately? | | CO1 | U | 1 |
| 5. | Expand CACP. | | CO5 | R | 1 |
| 6. | Name the federation established by GOI for marketing of forest products produced by the tribals in the country ------ | | CO4 | R | 1 |
| 7. | What is price elasticity of demand formula? | | CO3 | R | 1 |
| 8. | The utility which is created during the process of converting groundnut seeds into oil | | CO1 | A | 1 |
| 9. | How would you classify producer surplus? | | CO2 | R | 1 |
| 10. | Which trading technique used to avoid price risk? | | CO2 | R | 1 |
| 11. | Name the market integration which occurs when a firm gains control of other firms performing similar functions. | | CO3 | A | 1 |
| 12. | What is NCDC? | | CO5 | R | 1 |
| 13. | Find the crop for which Statutory Minimum Price (SMP) is applicable. | | CO2 | A | 1 |
| 14. | How many numbers of sellers are there in a Monopoly market? | | CO2 | U | 1 |
| 15. | When supply for a product increases, its price likely to ------------ | | CO2 | An | 1 |
| 16. | Which market purpose is to eliminate the unhealthy and unscrupulous  practices | | CO1 | R | 1 |
| 17. | Give one example for Geographical Indication (GI) | | CO5 | U | 1 |
| 18. | Choose True/ False – “India is a founding member of WTO” | | CO6 | R | 1 |
| 19. | When did WTO came into effect? | | CO6 | R | 1 |
| 20. | Recall the middlemen who do not buy and sell directly but assist in the marketing process | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | What is your opinion about Government role in supporting Agricultural  marketing in India? | | CO5 | E | 5 |
| 22. | Elucidate about NAFED. | | CO5 | R | 5 |
| 23. | Discuss about EXIM policies in India. | | CO6 | R | 5 |
| 24. | What is the relationship between marketable and marketed surplus? | | CO1 | An | 5 |
| 25. | Explain about the supply and types of elasticity of supply. | | CO2 | U | 5 |
| 26. | Brief about the functions and role of WTO. | | CO6 | U | 5 |
| 27. | What is marketing mix and explain the 4 Ps of marketing mix. | | CO1 | R | 5 |
| 28. | What are all the risks associated with agricultural marketing. | | CO3 | An | 5 |
| 29. | Explain in detail with examples about direct marketing channels in India. | | CO4 | U | 5 |
| 30. | Brief about CWC and SWC. | | CO5 | A | 5 |
| 31. | Describe about any one crop insurance scheme in India and write in brief  about its important features | | CO3 | E | 5 |
| 32. | What is Marketing channel? Explain in detail with an example. | | CO4 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss about the types of Market Integration. | CO1 | U | 7.5 |
|  | b. | Define IPR and explain the various types of IPR with example. | CO6 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss about various price policies in India favoring producers/farmers. | CO2 | An | 7.5 |
|  | b. | Evaluate the functions of different marketing agents or functionaries. | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain in detail about various classification of Markets. | CO2 | R | 7.5 |
|  | b. | What is your understanding about Cooperative marketing in India? | CO5 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Know the contours of agricultural market ecosystem, different market structures and their functions. |
| CO2 | Analyze the demand and supply problems in agricultural marketing systems, marketing efficiency and policies. |
| CO3 | Demonstrate the methods of valuation of farm assets |
| CO4 | Understand the food supply chain and its actors and activities. |
| CO5 | Gain practical skills on dealing with marketing institutions and warehouses. |
| CO6 | Understand international trade arrangements under WTO, Agreement on Agriculture (AOA) and EXIM policies. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 14.5 | 1 | 5 | - | - |  |
| CO2 | 2 | 9.5 | 1 | 8.5 | - | - |  |
| CO3 | 1 | - | 1 | 5 | 5 | - |  |
| CO4 | 8.5 | 6 | 5 | - | - | - |  |
| CO5 | 8 | 8.5 | 5 | - | 5 | - |  |
| CO6 | 7 | 12.5 | - | - | - | - |  |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2102** | **Duration** | **3hrs** |
| **Course Name** | **RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is Sociology and Rural Sociology? | | CO1 | R | 1 |
| 2. | …………. is a form of accommodation says, when contending parties do not settle differences among themselves, and it is frequently employed – the problem is submitted to a mutually agreeable third party who acts as a mediator capable of studying the issue objectively. | | CO5 | A | 1 |
| 3. | Mention few examples of ways through which Attitude change occurs. | | CO4 | E | 1 |
| 4. | What is Primary and Secondary Group? | | CO1 | U | 1 |
| 5. | Write about types of Motivation with examples. | | CO4 | A | 1 |
| 6. | What are the three domains of Learning stated in Bloom’s Taxonomy? | | CO3 | R | 1 |
| 7. | Present a few examples practiced in India to explain Material Culture. | | CO1 | E | 1 |
| 8. | Explain Social Control with examples. | | CO2 | E | 1 |
| 9. | Father of Psychology is **……………..** | | CO4 | R | 1 |
| 10. | What is Ethnocentrism? | | CO1 | A | 1 |
| 11. | Brief Rituals with examples. | | CO2 | An | 1 |
| 12. | What is Intelligence Quotient (IQ)? | | CO3 | An | 1 |
| 13. | What are the elements of society? | | CO2 | R | 1 |
| 14. | Write a note on Cultural Complex with an example. | | CO1 | An | 1 |
| 15. | What is Span of Attention and what is the name of the instrument used to determine it? | | CO3 | E | 1 |
| 16. | The web of human interaction and interrelationships is called …………. | | CO2 | A | 1 |
| 17. | ……………… Indian Rural Sociologist contributed a Textbook - Rural Sociology in India. | | CO6 | C | 1 |
| 18. | Brief Region and list its classification. | | CO5 | R | 1 |
| 19. | List any two types of sensation with sensory experiences. | | CO3 | A | 1 |
| 20. | …………….. Intelligence is the ability to understand and deal with verbal and mathematical symbols. | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the scope of Rural Sociology. | | CO1 | U | 5 |
| 22. | Write about functions of Culture based on importance for Individuals and groups. | | CO2 | A | 5 |
| 23. | Explain the classification of social groups as indicated by various Sociologists. | | CO1 | An | 5 |
| 24. | Brief Educational Psychology and its scope in agricultural extension. | | CO4 | An | 5 |
| 25. | Explain Teaching and its Principles. | | CO6 | R | 5 |
| 26. | Discuss determinants and errors of Perception. | | CO3 | A | 5 |
| 27. | Based on your understanding, write a critical note on motivation and the importance of motivation in extension. | | CO4 | C | 5 |
| 28. | Explain Social Development and substantiate it with its features and program coverage. | | CO5 | An | 5 |
| 29. | Critically write a note on Social Stratification with strata prevailing in the society. | | CO2 | C | 5 |
| 30. | Explain Social Change and factors of social change. | | CO5 | U | 5 |
| 31. | Explain Social Values with their types and characteristics. | | CO6 | A | 5 |
| 32. | Write a note on Principles of Human Behavior. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Based on various parameters compare and contrast Rural and Urban society. | CO1 | U | 7.5 |
|  | b. | Explain factors, streams, measurements, and impacts of Migration. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain types of Learning and their situation with examples in the Farming system. | CO6 | U | 7.5 |
|  | b. | Write about Attitude and factors influencing attitude development. | CO4 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain Personality and its measurements. | CO3 | R | 7.5 |
|  | b. | Explain Social Institutions with their characteristics and detail their major institutions with their classification. | CO5 | C | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the basic concepts of rural sociology |
| CO2 | Remember the significance of rural sociology in agricultural extension |
| CO3 | Analyze the pattern of behavioral changes in rural society under critical circumstances |
| CO4 | Apply the concepts of educational psychology in agriculture |
| CO5 | Apply knowledge of functions of social institutions |
| CO6 | Adopt the concept of agricultural extension practices in day day-to-day life of farmers |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 8.5 | 6 | 1 | 6 | 1 | 0 | 22.5 |
| CO2 | 1 | 7.5 | 6 | 1 | 1 | 5 | 21.5 |
| CO3 | 8.5 | 6 | 6 | 1 | 1 | 0 | 22.5 |
| CO4 | 1 | 7.5 | 1 | 5 | 1 | 5 | 20.5 |
| CO5 | 1 | 5 | 1 | 5 | 0 | 7.5 | 19.5 |
| CO6 | 5 | 7.5 | 5 | 0 | 0 | 1 | 18.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2102** | **Duration** | **3hrs** |
| **Course Name** | **RURAL SOCIOLOGY AND EDUCATIONAL PSYCHOLOGY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | | **CO** | **BL** | | | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | | |
|  | Leaders are \_\_\_\_\_\_\_: Borne / Made ( Choose). | | | CO1 | U | | | 1 |
|  | Who is a Democratic leader? | | | CO1 | R | | | 1 |
|  | Give an example of Religious Social Institution in rural society. | | | CO1 | A | | | 1 |
|  | Define Cultural Diffusion. | | | CO1 | R | | | 1 |
|  | In Extension Educational Psychology, ------------------are the target-learners for extension trainers. | | | CO2 | A | | | 1 |
|  | Name the theory that specifies ‘Kaliyug’ wherein people are false, dishonest, selfish and consequently unhappy. | | | CO1 | R | | | 1 |
|  | The level of intelligence IQ (90-110) may be indicated as --------------. | | | CO3 | R | | | 1 |
|  | In Matriarchal family, the authority rests with -------------- (Gender). | | | CO5 | R | | | 1 |
|  | The word “personality’ originated from the term “*persona*’ which means------------. | | | CO5 | R | | | 1 |
|  | -------------------- is the most fundamental trait/capacity of a leader. | | | CO3 | U | | | 1 |
|  | Educational Psychology deals with psychology applicable in --------------situations. | | | CO4 | R | | | 1 |
|  | What is the difference between a boss and a leader? | | | CO1 | A | | | 1 |
|  | What is Perception? | | | CO4 | R | | | 1 |
|  | Name an Error of Perception. | | | CO5 | R | | | 1 |
|  | Intrinsic Vs Extrinsic Motives: Differentiate. | | | CO1 | A | | | 1 |
|  | Needs Vs Wants: Differentiate. | | | CO1 | A | | | 1 |
|  | Give an example of rural problem that can be studied under Social Psychology. | | | CO4 | R | | | 1 |
|  | Psychology is the “ Science of ------------ | | | CO2 | R | | | 1 |
|  | Give an example of Organic Need. | | | CO4 | R | | | 1 |
|  | What is “Forgetting” in psychology? | | | CO5 | R | | | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | | |
|  | List out indicators of Social Change. | | | CO5 | R | | | 5 |
|  | List out roles of leaders. | | | CO1 | A | | | 5 |
|  | IQ Vs EQ: Differentiate with examples. Which is more crucial for extension work? | | | CO5 | An | | | 5 |
|  | Primary Group Vs Secondary Group: Differentiate with examples. | | | CO2 | U | | | 5 |
|  | Explain different ‘Needs’ (classification) of human beings. | | | CO5 | An | | | 5 |
|  | Elucidate different techniques of motivation (of farmers). | | | CO1 | C | | | 5 |
|  | Write short notes on “Economic Institutions” supporting farmers in rural areas. | | | CO4 | E | | | 5 |
|  | Elucidate the different types of personality given by Sheldon. | | | CO3 | U | | | 5 |
|  | List out the principles of learning. | | | CO3 | U | | | 5 |
|  | “Satisfied Customer is the Best Advertisement”. Apply this saying in agricultural extension situation. | | | CO3 | A | | | 5 |
| 31. | Write short notes on Memory Types. | | CO6 | | U | | 5 | |
| 32. | What are the determinants of Perception? | | CO4 | | R | 5 | | |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | | |
| 33. | a. | Explain the different methods selecting leaders. | | CO5 | A | | | 8 |
|  | b. | Write an essay on Training of local/rural leaders. | | CO5 | C | | | 7 |
|  |  |  | |  |  | | |  |
| 34. | a. | Explain the different methods of measuring personality. | | CO5 | R | | | 8 |
|  | b. | Briefly discuss the factors influencing intelligence. | | CO4 | A | | | 7 |
|  |  |  | |  |  | | |  |
| 35. | a. | What is the teaching-learning process? Describe the steps according to Wilson and Gallup. | | CO1 | A | | | 8 |
|  | b. | Theories of Social Change : Elaborate. | | CO1 | A | | | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Students learnt the rural society and their behavior pattern |
| CO2 | Students gained the practical knowledge of functions of social institution |
| CO3 | Familiarize the concept of agricultural extension practices |
| CO4 | Understand the concepts of Educational Psychology, Perception, Memory,  Intelligence, Personality |
| CO5 | Familiarize with motivation and its theories |
| CO6 | Know about teaching learning process |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Assessment Pattern as per Bloom’s Taxonomy | | | | | | | |
| CO / P | R | U | A | An | E | C | Total |
| CO1 | 5 | 5 | 21 | 5 |  | 5 | 41 |
| CO2 | 5 | 6 | 6 |  |  |  | 17 |
| CO3 | 2 | 15 | 6 | 5 |  |  | 23 |
| CO4 | 4 | 7 | 2 |  | 5 |  | 18 |
| CO5 | 4 |  |  | 5 |  | 7 | 16 |
| CO6 |  | 10 |  |  |  |  | 10 |
|  | 20 | 43 | 35 | 10 | 5 | 12 | 125 |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2103** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Bringing desirable changes in human behavior is known as \_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 2. | What is Gurgaon Experiment? | | CO2 | R | 1 |
| 3. | The word extension is derived from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_& \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 4. | NATP stands for\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO3 | R | 1 |
| 5. | The 'Training, and Visit System' of the new agricultural extension was initially developed by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO5 | R | 1 |
| 6. | What do you know about “Farm Clinic”? | | CO3 | An | 1 |
| 7. | High Yielding Variety Programme was launched in the year\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 8. | Intensive Agricultural District Programme is popularly known as\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 9. | What is the philosophy of Extension Education? | | CO1 | U | 1 |
| 10. | Sriniketan was started by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 11. | When was Community Development Program launched in the Country? | | CO2 | R | 1 |
| 12. | What are ABCs of Journalism? | | CO2 | An | 1 |
| 13. | Who are laggards? | | CO4 | An | 1 |
| 14. | What is e-choupal? | | CO4 | R | 1 |
| 15. | What is Adoption Process? | | CO4 | U | 1 |
| 16. | What is Communication Fidelity? | | CO5 | U | 1 |
| 17. | Who is known as the father of Extension in India? | | CO1 | R | 1 |
| 18. | What is Panchayati raj system? | | CO2 | R | 1 |
| 19. | “Never do anything by yourself that you can get someone to do for you” is the principle of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | An | 1 |
| 20. | The process of assessing the impact of project / program as set by the goals/objectives is known as? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the differentiation between formal and non-formal education. | | CO1 | U | 5 |
| 22. | List out the principles of Extension. | | CO1 | U | 5 |
| 23. | The calendar of work in extension programme planning can be described as\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO2 | An | 5 |
| 24. | Write down the steps in Extension Programme Planning Process. | | CO2 | U | 5 |
| 25. | Describe Marthadam Project. | | CO3 | U | 5 |
| 26. | Describe the principles of Sewagram started my Mahatma Gandhi. | | CO3 | U | 5 |
| 27. | Write a brief note on Etawah Pilot Project. | | CO2 | U | 5 |
| 28. | Explain the elements of Teaching –Learning situation? | | CO2 | An | 5 |
| 29. | What are the elements of the Diffusion process? | | CO2 | An | 5 |
| 30. | What are all the characteristics of a good message? | | CO3 | A | 5 |
| 31. | Describe “Result Demonstration”. | | CO2 | U | 5 |
| 32. | Explain AIDCAS in extension teaching. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List out various communication models and describe the elements of communication. | CO5 | A | 10 |
|  | b. | Describe the functions of Communication. | CO5 | An | 5 |
|  |  |  |  |  |  |
| 34. | b. | List out the extension teaching methods according to use in a flowchart. | CO4 | U | 10 |
|  | a. | What are the Adopter Categories and describe their characteristics with a neat diagram. | CO4 | An | 5 |
|  |  |  |  |  |  |
| 35. | a. | What is Cyber-extension? Role of ICTs in agricultural extension. | CO3 | U | 10 |
|  | b. | Write a note on Farmer-Led Extension. | CO5 | U | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand agricultural extension and rural development programs |
| CO2 | Create employment opportunities based on the knowledge gained on different schemes operated by state and central governments. |
| CO3 | Remember the new innovations in the area of agricultural extension in India |
| CO4 | Apply the practical knowledge gained on technology transfer from lab to land |
| CO5 | Create awareness among farmers on different communication technology and journals available for scientific farming |

|  |  |  |  |  |  |  |  |
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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 12 |  |  |  |  | 14 |
| CO2 | 6 | 15 |  | 16 |  |  | 37 |
| CO3 | 2 | 19 | 5 | 1 |  |  | 27 |
| CO4 | 1 | 12 |  | 7 |  |  | 20 |
| CO5 |  | 12 | 10 | 5 |  |  | 27 |
|  | | | | | | | **125** |



|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2152** | **Duration** | **3hrs** |
| **Course Name** | **PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the rice pest that causes damage to the rice grains at milky stage. | | CO2 | U | 1 |
| 2. | Clipping of rice seedling before transplanting is a management practice to control ……………… | | CO3 | U | 1 |
| 3. | Recognize the pest which creates shot holes on sorghum leaves. | | CO2 | U | 1 |
| 4. | Swelling on the stem just above the ground level in cotton is the characteristic symptom caused by ………………… | | CO2 | R | 1 |
| 5. | Digging out a drench around the field is to control ………… pest in groundnut. | | CO3 | A | 1 |
| 6. | Name the vector that transmits red gram sterility mosaic disease. | | CO1 | R | 1 |
| 7. | Name the pest which feeds on foliage, flower buds and pods of gingelly. | | CO2 | U | 1 |
| 8. | Write the scientific name of pink bollworm. | | CO1 | R | 1 |
| 9. | Presence of boreholes with fresh excreta in the nodal region and reddening of affected tissues in sugarcane is caused by ……………… | | CO2 | An | 1 |
| 10. | Name the pest which transmits bhendi yellow mosaic virus. | | CO1 | R | 1 |
| 11. | Oozing of reddish fluid from the boreholes on the tree trunk of coconut is the infestation of ………………….. | | CO2 | An | 1 |
| 12. | Write the scientific name of diamond back moth. | | CO2 | R | 1 |
| 13. | Name the attractant used for fruit fly management in cucurbits. | | CO3 | A | 1 |
| 14. | Quote an example for field and storage pest of sweet potato. | | CO3 | U | 1 |
| 15. | Name the vector that transmits banana bunchy top disease. | | CO1 | R | 1 |
| 16. | Write the scientific name of papaya mealybug. | | CO1 | R | 1 |
| 17. | Oozing of gummy exudates from the moringa pods is due to the attack of ………………. | | CO2 | U | 1 |
| 18. | Name the pest of mango that can be managed by padding method. | | CO3 | An | 1 |
| 19. | Name the pest that causes shot holes in grapevine. | | CO2 | An | 1 |
| 20. | Write an example for primary pests of stored products. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Classify the insect pests based on occurrence and the level of infestation. | | CO1 | R | 5 |
| 22. | Define IPM and enlist the components of IPM. | | CO3 | A | 5 |
| 23. | Discuss the symptoms of any FIVE major pests of red gram and highlight appropriate management strategies. | | CO3 | U | 5 |
| 24. | Give an illustrated account on major pests of castor and recommend control measures. | | CO2 | An | 5 |
| 25. | Explain any FIVE serious pests of chilli and suggest suitable methods of control. | | CO3 | An | 5 |
| 26. | Write the scientific name of rhinoceros beetle and explain its symptom and management. | | CO2 | R | 5 |
| 27. | Summarize the symptoms of any FIVE major pests of pepper and recommend control measures. | | CO3 | U | 5 |
| 28. | Explain the major pests of turmeric and recommend control measures. | | CO3 | U | 5 |
| 29. | Give an illustrated account on pests of rose and its management. | | CO3 | A | 5 |
| 30. | Discuss the major pests of banana and enlist effective management strategies. | | CO2 | An | 5 |
| 31. | Classify the types of injury by insect pests to plants with examples. | | CO2 | R | 5 |
| 32. | Brief about the pests of bhendi and their management. | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Give an account of the bollworms in cotton and enumerate IPM practices. | CO3 | U | 7.5 |
|  | b. | Enumerate the serious pests of maize and suggest suitable methods for management. | CO2 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the major pests of mango and enlist effective management strategies. | CO3 | An | 7.5 |
|  | b. | Enumerate the borer pests of sugarcane and suggest suitable methods for management. | CO3 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the non-insect pests associated with stored grains and explain their management strategies. | CO4 | A | 7.5 |
|  | b. | Discuss the major pests of cardamom and their management. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Remember morphology and taxonomic characteristics of insect pests affecting crops and stored grains |
| CO2 | Understand nature and type of damage by different arthropod pests in field, vegetable, fruit and plantation crops, ornamental crops, spices and condiments |
| CO3 | Analyze factors influencing pest occurrence, distribution and control measures |
| CO4 | Summarize factors affecting losses of stored grain, |
| CO5 | Analyze the role of various factors in deterioration of grain and their management strategies |
| CO6 | Recommend pest management measures to resource poor farmers |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | - | - | - | - | - | 10 |
| CO2 | 11 | 5 |  | 20.5 | - | - | 36.5 |
| CO3 | 5 | 32 | 19.5 | 13.5 | - | - | 70 |
| CO4 | 1 | - | 7.5 | - | - | - | 8.5 |
| CO5 | - | - | - | - | - | - |  |
| CO6 | - | - | - | - | - | - |  |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2202** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF PLANT BREEDING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define – Plant breeding. | | CO1 | U | 1 |
| 2. | Give one significance of apomixes in plant breeding. | | CO1 | U | 1 |
| 3. | Define – Hybridization. | | CO1 | U | 1 |
| 4. | The concept of centers of origin was proposed by…… | | CO2 | R | 1 |
| 5. | What is synthetic variety? | | CO3 | R | 1 |
| 6. | Define cleistogamy with examples. | | CO1 | R | 1 |
| 7. | A progeny descendent solely by self-pollination from a single homozygous plant is known as………… | | CO3 | U | 1 |
| 8. | Hybrids are …… Heterozygous or Homozygous. | | CO4 | U | 1 |
| 9. | The adaptation of a plant to a changed climate to a new climate is called …… | | CO1 | R | 1 |
| 10. | What is inbred line breeding? | | CO3 | R | 1 |
| 11. | Origin of soybean ………. | | CO2 | R | 1 |
| 12. | The cross between an inbred line and an open-pollinated variety of maize is known as …….. | | CO3 | R | 1 |
| 13. | What is an example of a multiline variety? | | CO3 | U | 1 |
| 14. | Define clone. | | CO4 | U | 1 |
| 15. | F1 is crossed back with its parent is called………… | | CO3 | U | 1 |
| 16. | What is meant by primary introduction? | | CO2 | R | 1 |
| 17. | Give two important contributions of Dr.M.S.Swaminathan in plant breeding. | | CO1 | U | 1 |
| 18. | The first inter-generic hybrid with great potential was ……….. | | CO4 | R | 1 |
| 19. | Define - mutation. | | CO4 | R | 1 |
| 20. | What do you mean by Breeders’ Rights? | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write about the application of back cross method in plant breeding. | | CO3 | A | 5 |
| 22. | Compare the procedure in pure line and mass selection. | | CO3 | E | 5 |
| 23. | Give a detailed note on different types of recurrent selection with applications. | | CO3 | A | 5 |
| 24. | Elaborate on the barriers in wide hybridization and how to overcome it. | | CO4 | C | 5 |
| 25. | What are the characteristics of mutations and their role in plant breeding? | | CO4 | U | 5 |
| 26. | State centers of origin? Describe the different types of centers of origin. | | CO2 | R | 5 |
| 27. | What are synthetic seeds? What are the advantages and disadvantages of synthetic seeds? | | CO4 | R | 5 |
| 28. | What are plant breeders’ rights and farmers’ rights? Discuss. | | CO6 | U | 5 |
| 29. | What is emasculation and describe the methods of emasculation. | | CO1 | U | 5 |
| 30. | What is plant introduction and write their types? | | CO1 | An | 5 |
| 31. | Describe hybridization techniques. | | CO1 | U | 5 |
| 32. | Define heterosis. What are the different methods of estimation of heterosis? | | CO3 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain Hardy-Weinberg Law and the factors affecting it. | CO3 | R | 8 |
|  | b. | What is genetic male sterility? Describe the merits and demerits of genetic male sterility. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Draw a schematic diagram of the pedigree method. Briefly explain its merits and demerits. | CO3 | An | 8 |
|  | b. | What is a mutagen and classify elaborately physical and chemical mutagen? | CO4 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Briefly describe the methods of production of autopolyploids and their importance and limitations in crop improvement. | CO4 | U | 8 |
|  | b. | Describe the different plant breeding methods of cross-pollinated crops. | CO3 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the basic concepts of plant breeding and genetics. |
| CO2 | Remember the Origin and diversity of different crops, components of inheritance, and variations. |
| CO3 | Apply the knowledge to develop high-yielding crops with better quality. |
| CO4 | Produce varieties and hybrids with Host Plant Resistance. |
| CO5 | Apply the protocols of Intellectual Property Rights and Patenting practically. |
| CO6 | Analyze Plant Breeders and & Farmer’s Rights for research and commercial seed production of high-yielding crops. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 21 | - | 5 | - | - | 28 |
| CO2 | 8 | - | - | - | - | - | 8 |
| CO3 | 11 | 10 | 10 | 13 | 5 | - | 49 |
| CO4 | 7 | 15 | 7 | - | - | 5 | 34 |
| CO5 | - | - | - | - | - | - | - |
| CO6 | 1 | 5 | - | - | - | - | 6 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2203** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF SEED TECHNOLOGY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | |
| 1. | | Write the example for moisture proof and vapour pervious container. | | CO 6 | R | 1 |
| 2. | | Minimum genetic purity required for certified seed production is \_\_\_\_\_ | | CO 2 | U | 1 |
| 3. | | --------- is a protective layer of a radicle. | | CO 1 | A | 1 |
| 4. | | Minimum physical purity required for ground nut is ------- | | CO2 | A | 1 |
| 5. | | Tag color for certified seed is \_\_\_\_\_\_\_\_\_. | | CO2 | R | 1 |
| 6. | | If the seed farm area exceeds 25 acres, seed producer required a separate ---- report. | | CO2 | U | 1 |
| 7. | | Who is incharge for quality control of certified seed? | | CO2 | C | 1 |
| 8. | | Which is an objectionable weed plant of bhendi? | | CO1 | E | 1 |
| 9. | | ---------- percentages of ill - filled pods can be allowed in groundnut pod verification. | | CO3 | An | 1 |
| 10. | | Which section of seed act 1966 gives power to notify kinds or varieties? | | CO3 | R | 1 |
| 11. | | Which section of seed act 1966 specify the role of seed inspectors? | | CO3 | U | 1 |
| 12. | | Which section of seed act 1966 mention about the penalty? | | CO3 | A | 1 |
| 13. | | No transgenic variety of seed would be registered unless the applicant has obtained clearance under the provisions of ------------- act. | | CO5 | C | 1 |
| 14. | | The Registration Sub-Committee of seed bill 2004 will maintain a **-------**for registering all kinds of seeds. | | CO2 | R | 1 |
| 15. | | Genetically modified crop is a plant into which -------- have been artificially inserted. | | CO5 | U | 1 |
| 16. | | Mention the DNA based GMO detection method\_\_\_\_. | | CO5 | C | 1 |
| 17. | | ELISA stands for-----. | | CO5 | R | 1 |
| 18. | | Who is a certification body for organic seed production in INDIA? | | CO6 | An | 1 |
| 19. | | OECD stands for -------. | | CO6 | R | 1 |
| 20. | | Physiological maturation symptoms for bhendi------- | | CO5 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | |
| 21. | | Write the basic physical and genetic quality characters of seeds. | | CO1 | U | 5 |
| 22. | | Write about the inseparable other crops and objectionable weed plants | | CO1 | R | 5 |
| 23. | | Write about the key points observed at each stage of field inspection. | | CO2 | A | 5 |
| 24. | | Write about labelling, tagging, sealing and grant of certificate. | | CO2 | R | 5 |
| 25. | | Write about the Central Seed Laboratory and State Seed Laboratory. | | CO2 | R | 5 |
| 26. | | Write about the seed analyst and report of the seed analyst. | | CO2 | E | 5 |
| 27. | | Differentiate the physiological and harvestable maturation. | | CO4 | C | 5 |
| 28. | | Write about the colour separator. | | CO6 | An | 5 |
| 29. | | Write about OECD. | | CO5 | A | 5 |
| 30. | | Explain the Structure of seed marketing. | | CO5 | E | 5 |
| 31. | | Mention the factors affecting the final marketing price. | | CO6 | E | 5 |
| 32. | | Write about the different stages of seed storage. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | |
| 33. | Elaborate the agronomic principles of seed production. | | | CO1 | U | 15 |
|  |  | | |  |  |  |
| 34. | Explain about the seed control order 1983. | | | CO2 | R | 15 |
|  | | |  |  |  |  |
| 35. | | a. | Give detailed information on ELISA. | CO5 | U | 8 |
|  | | b. | Write about PCR based GMO detection method. | CO5 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the importance of quality seed in agriculture production. |
| CO2 | Distinguish types of seeds and know seed certification process |
| CO3 | Apply seed production agronomic principles and quality assessment. |
| CO4 | Describe seed structure and morphology, physical characteristics of seed |
| CO5 | Conduct varietal identification, seed quality assessments tests and seed treatments |
| CO6 | Remember the concepts in seed storage and seed marketing |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 25 | 1 |  | 1 |  | 32 |
| CO2 | 27 | 2 | 6 |  | 5 | 1 | 41 |
| CO3 | 1 | 1 | 1 | 1 |  |  | 4 |
| CO4 |  |  |  |  |  | 5 | 5 |
| CO5 | 6 | 9 |  |  | 5 | 8 | 28 |
| CO6 | 5 |  |  | 5 | 5 |  | 15 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2204** | **Duration** | **3hrs** |
| **Course Name** | **CROP IMPROVEMENT – I (*KHARIF* CROPS)** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define center of origin. | | CO1 | U | 1 |
| 2. | What are plant genetic resources? | | CO1 | R | 1 |
| 3. | Explain about land races. | | CO2 | U | 1 |
| 4. | List out the Germplasm activities. | | CO2 | U | 1 |
| 5. | Define aestivation. | | CO2 | R | 1 |
| 6. | Expand IRRI and ICRISAT. | | CO3 | R | 1 |
| 7. | Difference between food and cash crops. | | CO3 | R | 1 |
| 8. | Explain genetic erosion. | | CO4 | U | 1 |
| 9. | Explain about Gametocide. | | CO4 | U | 1 |
| 10. | What is Dichogamy? | | CO5 | U | 1 |
| 11. | Explain about penetrance. | | CO5 | U | 1 |
| 12. | Explain plant introduction and give an example. | | CO5 | R | 1 |
| 13. | What are the uses of pure line selections? | | CO6 | U | 1 |
| 14. | Write the types of mass selection. | | CO6 | R | 1 |
| 15. | What is meant by hybridization? | | CO6 | U | 1 |
| 16. | Explain Cybridization. | | CO6 | R | 1 |
| 17. | Expand GMO. | | CO6 | R | 1 |
| 18. | Write the importance of quality improvement in crop breeding. | | CO6 | U | 1 |
| 19. | What is the isolation distance of maize seed production? | | CO6 | R | 1 |
| 20. | Explain about cytoplasmic male sterility. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain about the transgenic plant and its uses. | | CO1 | R | 5 |
| 22. | Difference between orthodox seeds and recalcitrant seeds. | | CO1 | U | 5 |
| 23. | Difference between qualitative and quantitative traits. | | CO2 | U | 5 |
| 24. | What are the methods of breeding asexually propagated species? | | CO2 | U | 5 |
| 25. | What are the measures for maintaining genetic purity during seed production? | | CO3 | R | 5 |
| 26. | Write short notes on nucleus, breeder, foundation, and certified seed. | | CO3 | U | 5 |
| 27. | Write short notes on hybrid seed production techniques in maize. | | CO4 | U | 5 |
| 28. | Write the importance of a salt-tolerant crop breeding program. | | CO4 | R | 5 |
| 29. | List out the breeding objective of the pulse crop. | | CO5 | U | 5 |
| 30. | Difference between biotic and abiotic stress in plants. | | CO5 | U | 5 |
| 31. | Explain climate-resilient crop varieties and their application and future. | | CO6 | R | 5 |
| 32. | Expand IRRI, ICRISAT, IARI, CPRI, and CIMMYT. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List out the kharif crop centers of origin and distribution. | CO1 | R | 7.5 |
|  | b. | Explain about importance of plant genetic resources, their utilization, and conservation in crop breeding programs. | CO3 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | List the breeding objectives of rice. | CO2 | U | 7.5 |
|  | b. | Write the merits and demerits of ideotype breeding. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain quantitative characteristics in crop breeding and the importance of crop improvement. | CO4 | R | 7.5 |
|  | b. | What are the factors for which variety improvement of the crop is done? | CO1 | R | 7.5 |

**CO – COURSE OUTCOME BL – BLOOM’S LEVEL**

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Remember the origin and diversity of different crops, components of inheritance, and various crop improvement techniques |
| CO2 | Understand the genetics of qualitative and quantitative characters |
| CO3 | Remember different breeding procedures for genetic improvement of Kharif crops |
| CO4 | Evaluate the adaptability, stability, quality parameters, biotic and abiotic stress of various kharif crops |
| CO5 | Utilize hybrid seed production techniques in the cultivation of Kharif crops |
| CO6 | Design and conduct field experiments to analyze the quality characters of donor parents |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 22 | 6 | - | - | - | - | 28 |
| **CO2** | 1 | 30 | - | - | - | - | 31 |
| **CO3** | 14.5 | 5 | - | - | - | - | 19.5 |
| **CO4** | 12.5 | 5 | - | - | - | - | 17.5 |
| **CO5** | 1 | 12 | - | - | - | - | 13 |
| **CO6** | 15 | 1 | - | - | - | - | 16 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2304** | **Duration** | **3hrs** |
| **Course Name** | **ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Environment. | | CO1 | U | 1 |
| 2. | Define Mesopause. | | CO1 | U | 1 |
| 3. | Define Inexhaustible Resources. | | CO1 | R | 1 |
| 4. | Define Deforestation. | | CO2 | U | 1 |
| 5. | Define Floods. | | CO1 | U | 1 |
| 6. | Define Igneous rock. | | CO1 | U | 1 |
| 7. | What are Non-renewable energy sources? | | CO1 | R | 1 |
| 8. | Differentiate Nuclear energy and solar energy. | | CO1 | U | 1 |
| 9. | Write about Biofuels with examples. | | CO1 | U | 1 |
| 10. | What is Desertification? | | CO1 | A | 1 |
| 11. | Define Consumers. | | CO2 | R | 1 |
| 12. | Illustrate Sedimentary cycle. | | CO1 | R | 1 |
| 13. | differentiate flora and fauna. | | CO2 | R | 1 |
| 14. | Define Biodiversity. | | CO2 | R | 1 |
| 15. | What is meant by the Red data book? | | CO2 | R | 1 |
| 16. | Differentiate Pollution vs Contamination. | | CO3 | R | 1 |
| 17. | Illustrate Gray water. | | CO3 | R | 1 |
| 18. | Define Hazards. | | CO6 | R | 1 |
| 19. | What is Central Dense Overcast? | | CO5 | R | 1 |
| 20. | What is meant by Vesuvian? | | CO6 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | What are the Key Concepts in Environmental Science? | | CO1 | R | 5 |
| 22. | List out the types of Indian forests. | | CO2 | R | 5 |
| 23. | Write short notes on Carbon cycle. | | CO3 | U | 5 |
| 24. | List out the general soil conservation practices. | | CO4 | R | 5 |
| 25. | Write short notes on Endemic species in India. | | CO2 | U | 5 |
| 26. | Write short notes on pollutants and their types. | | CO3 | U | 5 |
| 27. | Write short notes on types of air pollutants. | | CO3 | U | 5 |
| 28. | Describe Blue Baby syndrome. | | CO3 | R | 5 |
| 29. | Write short notes on different types of Drought. | | CO6 | A | 5 |
| 30. | Write short notes on Climate Change | | CO6 | R | 5 |
| 31. | Discuss the Bhopal gas tragedy. | | CO3 | R | 5 |
| 32. | What is the role of media in Disaster management? | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss briefly mining, mining methods, and its impact. | CO1 | R | 7.5 |
|  | b. | Explain in detail about DAMS as a water resource. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write a detailed note on Acid rain and its effects and solutions. | CO3 | U | 7.5 |
|  | b. | Write in detail about Rain Water Harvesting and its methods. | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Write a detailed note on the Environment Protection Act. | CO5 | R | 7.5 |
|  | b. | Write in detail about different types of Disasters. | CO6 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Identify and distinguish the natural resources- Renewable and Non-renewable. |
| CO2 | Illustrate the concepts of ecosystem and biodiversity. |
| CO3 | Examine and solve environmental pollution issues. |
| CO4 | Plan the conservation strategies. |
| CO5 | Make use of Environmental legislation. |
| CO6 | Appraise the disaster management strategies. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 30 |  |  |  |  |  | 30 |
| CO2 |  | 30 |  |  |  |  | 30 |
| CO3 |  |  | 42 |  |  |  | 42 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 | 16 |  |  |  |  |  | 16 |
| CO6 |  |  | 32 |  |  |  | 32 |
|  | | | | | | | **170** |



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| **Course Code** | **21AG2305** | **Duration** | **3hrs** |
| **Course Name** | **RENEWABLE ENERGY AND GREEN TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What are the renewable sources of energy? | | CO1 | R | 1 |
| 2. | Define kinetic energy. | | CO1 | U | 1 |
| 3. | What is Bio-fuel? | | CO1 | U | 1 |
| 4. | What is solar PV systems? | | CO3 | U | 1 |
| 5. | Name the substance related to gasification agent. | | CO1 | R | 1 |
| 6. | List the Properties of Biogas. | | CO2 | U | 1 |
| 7. | How scaling of the digester is done? | | CO1 | R | 1 |
| 8. | Define motion. | | CO2 | U | 1 |
| 9. | What are the disadvantages of floating drum plant? | | CO2 | U | 1 |
| 10. | What do you understand by evaporation of inherent moisture? | | CO2 | U | 1 |
| 11. | What is Deenbandhu Biogas Plants? | | CO1 | R | 1 |
| 12. | What is Char residue? | | CO3 | U | 1 |
| 13. | What are the parameters for sizing of biogas plant? | | CO6 | R | 1 |
| 14. | What do you understand by thermal energy? | | CO5 | A | 1 |
| 15. | List the materials for plant construction. | | CO2 | R | 1 |
| 16. | Define thermochemical gasification. | | CO2 | U | 1 |
| 17. | What is Jatropha oil? | | CO4 | R | 1 |
| 18. | What are the disadvantages of geothermal energy? | | CO1 | A | 1 |
| 19. | Define transesterification. | | CO2 | R | 1 |
| 20. | What do you understand by Char gasification? | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on basic components of a wind Electric Systems. | | CO3 | U | 5 |
| 22. | What are the disadvantages of bioethanol? | | CO5 | An | 5 |
| 23. | Write in brief about the wind system. | | CO4 | An | 5 |
| 24. | Explain fundamentals of Photovoltaic Materials. | | CO3 | A | 5 |
| 25. | Describe Hydro- Energy conversion system. | | CO3 | U | 5 |
| 26. | How Bio-ethanol can reduce the environmental impact of the transport sector. | | CO2 | U | 5 |
| 27. | Explain solar lantern. | | CO5 | R | 5 |
| 28. | Describe forced convection Solar Drier for Drying of Grains. | | CO4 | U | 5 |
| 29. | What are the have five main components of flat-plate collectors of a solar water heater? | | CO4 | A | 5 |
| 30. | Write short notes on photovoltaic and Photovoltaic Cells. | | CO2 | A | 5 |
| 31. | Write short notes on PHES. | | CO3 | R | 5 |
| 32. | What are the disadvantages of Fossil fuels? | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain fixed bed gasifier | CO5 | E | 7 |
|  | b. | Explain in detail the principles of solid fuel gasification. | CO6 | An | 8 |
|  |  |  |  |  |  |
| 34. | a. | Explain in detail the solar water pumping system. | CO6 | E | 8 |
|  | b. | Explain gravitational Potential Energy. | CO6 | E | 7 |
|  |  |  |  |  |  |
| 35. | a. | If a farmer has 3 animals, calculate how many hours a medium size stove can run? | CO6 | C | 7 |
|  | b. | If 2.91 kWh is available as electrical energy from 32 kg of Cow dung then how many bulbs and fan can consume the same? | CO5 | C | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Gain basic knowledge of Solar energy harvesting |
| CO2 | Familiarize with different types of Solar energy gadgets |
| CO3 | Understand the contributions of energy sources to agriculture |
| CO4 | Remember different types of biogas production structures |
| CO5 | Design renewable energy structures |
| CO6 | Analyze the green energy techniques |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 6 | 4 |  |  |  |  |
| CO2 |  | 5 |  | 7 |  |  |  |
| CO3 |  | 3 | 2 | 5 | 3 |  |  |
| CO4 |  |  | 7 | 3 |  | 2 |  |
| CO5 |  |  |  |  | 21 | 18 |  |
| CO6 |  |  |  |  | 18 | 18 |  |
|  | | | | | | | **125** |

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Description automatically generated with medium confidence**

**END SEMESTER EXAMINATION – NOVEMBER 2023**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2306** | **Duration** | **3hrs** |
| **Course Name** | **MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Differentiate Soil Fertility and Soil Productivity. | | CO 2 | An | 1 |
| 2. | State the Criteria of Essentiality. | | CO 2 | R | 1 |
| 3. | List out the Essential nutrients. | | CO 2 | R | 1 |
| 4. | Draw a neat sketch of the plant growth/yield curve. | | CO 2 | A | 1 |
| 5. | The following symptoms occur in plants due to the deficiency of which nutrients?   1. Hen and Chicken in Grapes 2. Whiptail of Cauliflower | | CO 2 | R | 1 |
| 6. | Write about the root interception mechanism in nutrient transport. | | CO 2 | U | 1 |
| 7. | Differentiate Mineralization and Immobilisation. | | CO 1 | An | 1 |
| 8. | Write about the Chelation Process. | | CO 1 | A | 1 |
| 9. | Name the Scientists involved in proposing the following concepts.   1. Law of Minimum 2. Permanent Manurial Experiments | | CO 2 | A | 1 |
| 10. | In soil fertility evaluation,   1. Sunflower is used as an indicator plant for testing which nutrient? 2. Mehlinchs Cunninghamella test is related to which nutrient? | | CO 4 | U | 1 |
| 11. | Propose a solution for controlling button-shedding in coconut. | | CO 6 | C | 1 |
| 12. | What blanket recommendations will you give to a farmer who decides to grow the rice crop? | | CO 6 | E | 1 |
| 13. | Define Biuret. | | CO 1 | U | 1 |
| 14. | Differentiate Agronomic Efficiency and Recovery Efficiency. | | CO 5 | An | 1 |
| 15. | In which forms does the plant uptake Nitrogen and Potassium ions from the soil? | | CO 5 | U | 1 |
| 16. | Classification of Nitrogen fertilizers. | | CO 1 | U | 1 |
| 17. | List out the phosphorous fertilizers. | | CO 3 | R | 1 |
| 18. | Define fertigation. | | CO 6 | R | 1 |
| 19. | Name the two different methods followed in estimating soil phosphorous. | | CO 3 | E | 1 |
| 20. | Name the instruments used in the determination of the following nutrients.   1. Soil Available Potassium 2. Soil Micronutrients | | CO 3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the transformation of phosphorous in soil with a neat sketch. | | CO 2 | U | 5 |
| 22. | Discuss in detail about the methods of soil fertility evaluation. | | CO 4 | U | 5 |
| 23. | Quote the critical levels of essential nutrients. | | CO 2 | R | 5 |
| 24. | Appraise the classification of organic manure and explain the preparation of FYM. | | CO 1 | E | 5 |
| 25. | Write in detail about the Complex fertilizers and Mixed fertilizers. | | CO 1 | An | 5 |
| 26. | Discuss about the Fertilizer Control Order in detail. | | CO 3 | U | 5 |
| 27. | Propose some techniques for improving Nutrient Use Efficiency. | | CO 5 | C | 5 |
| 28. | Compile about the usage of advanced techniques in fertilizer recommendations. | | CO 6 | C | 5 |
| 29. | Illustrate the Sulphur transformation in soil with a neat sketch. | | CO 1 | A | 5 |
| 30. | Compare and discuss about the Green Manuring and Green Leaf manuring. | | CO 4 | An | 5 |
| 31. | Describe about the Integrated Nutrient Management. | | CO 3 | U | 5 |
| 32. | List out the secondary and micronutrient fertilizers. | | CO 1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the functions and deficiency symptoms of essential nutrients with suitable examples. | CO 4 | An | 10 |
|  | b. | Discuss the nutrient transport mechanism in plants. | CO 1 | U | 5 |
|  |  |  |  |  |  |
| 34. | a. | Illustrate the Nitrogen transformation in soil with a neat sketch. | CO 2 | A | 10 |
|  | b. | Explain the procedure involved in rapid plant tissue test of primary nutrients. | CO 5 | R | 5 |
|  |  |  |  |  |  |
| 35. | a. | Furnish the details of different methods of fertilizer applications under rainfed and irrigated conditions. | CO 3 | E | 10 |
|  | b. | Summarize the different fertilizer recommendation approaches. | CO 6 | C | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the properties of manures, fertilizers, and soil amendments |
| CO2 | Summarize the concepts of soil fertility and plant nutrition and the chemistry of nutrients in soil |
| CO3 | Demonstrate Integrated Nutrient Management and Fertilizer recommendation practices |
| CO4 | Evaluate the fertility of the soil |
| CO5 | Analyze the plant nutrient content |
| CO6 | Recommend fertilizer dosage for different soil types |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 12 | 6 | 16 | 5 | - | 39 |
| CO2 | 8 | 6 | 12 | 1 | - | - | 27 |
| CO3 | 2 | 10 | - | - | 11 | - | 23 |
| CO4 | - | 6 | - | 5 | - | - | 11 |
| CO5 | 5 | 1 | - | 1 | - | 5 | 12 |
| CO6 | 1 | - | - | - | 1 | 11 | 13 |
|  | **16** | **35** | **18** | **23** | **17** | **16** | **125** |



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| **Course Code** | **21AG2307** | **Duration** | **3hrs** |
| **Course Name** | **PROBLEMATIC SOILS AND THEIR MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the lands which are underutilized due to degradation. | | CO1 | R | 1 |
| 2. | Write the term to describe increased concentration of organochlorine insecticides in fish and birds through food chain. | | CO3 | A | 1 |
| 3. | State the type of man-made erosion. | | CO3 | An | 1 |
| 4. | Name the process of conversion of NO3N to gaseous nitrogen during flooding. | | CO3 | U | 1 |
| 5. | Expand SAR. | | CO3 | R | 1 |
| 6. | Name the problem soil characterized by surface crust of white salts. | | CO3 | U | 1 |
| 7. | State one crop suitable for sodic soil. | | CO4 | R | 1 |
| 8. | Name the cationic species present in acid soils. | | CO3 | A | 1 |
| 9. | Name the soil predominated by CaCO3. | | CO3 | An | 1 |
| 10. | Name the two basic processes involved in remote sensing. | | CO5 | R | 1 |
| 11. | Indicate the pH of potential acid sulphate soils. | | CO3 | An | 1 |
| 12. | Mention any two factors affecting inherent soil quality. | | CO1 | U | 1 |
| 13. | Name the source for lead (Pb) contamination in soil. | | CO3 | R | 1 |
| 14. | Indicate the Land Capability Classes suitable for agriculture. | | CO6 | A | 1 |
| 15. | Mention the region of India where poor workability of soil is the problem. | | CO6 | An | 1 |
| 16. | List the components of soil integrated in its health. | | CO1 | U | 1 |
| 17. | Name the tree species grown for reclamation of waterlogged soils. | | CO4 | A | 1 |
| 18. | State the method used to remove pollutants from soil using biological agents. | | CO4 | R | 1 |
| 19. | Write one reclamation practice for subsoil hardpan. | | CO4 | A | 1 |
| 20. | Mention the reclamation procedure for fluffy paddy soil. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the causes and impacts of soil pollution. | | CO3 | An | 5 |
| 22. | List out the causes and harmful effects of soil erosion by water. | | CO3 | U | 5 |
| 23. | Discuss on quality criteria of irrigation water. | | CO2 | E | 5 |
| 24. | Briefly describe different systems of land capability classification. | | CO6 | U | 5 |
| 25. | List out the chemical characteristics of acid, saline and sodic soils. | | CO3 | R | 5 |
| 26. | Explain the role of multipurpose trees in the remediation of soil problems. | | CO4 | E | 5 |
| 27. | Narrate three steps of wind erosion. | | CO3 | R | 5 |
| 28. | Differentiate the management practices for alkali and acid soils. | | CO4 | An | 5 |
| 29. | Explain the on-site and off-site effects of soil compaction. | | CO2 | E | 5 |
| 30. | Differentiate slow permeable and high permeable soil characteristics. | | CO2 | An | 5 |
| 31. | Mention the biological constraints in soil and explain them in detail. | | CO3 | R | 5 |
| 32. | Write short notes on brackish water. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe soil health card and list out management methods to improve soil health. | CO1 | A | 8 |
|  | b. | Write in detail about natural and manmade waste lands. | CO1 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the formation of saline soils and describe its characters and reclamation measures. | CO4 | A | 8 |
|  | b. | Elaborate about flooded soils and their management. | CO4 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | List the components of Remote sensing and describe in detail their role and benefits in natural resource management. | CO5 | R | 8 |
|  | b. | Briefly describe different bioremediation techniques and advantages and disadvantages of Bioremediation | CO5 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Interpret the soil quality based on their properties and characters. |
| CO2 | Interpret the quality of irrigation water. |
| CO3 | Categorize and characterize the problematic soils. |
| CO4 | Plan appropriate reclamation and management practices for problematic soils. |
| CO5 | Demonstrate the application of Remote sensing, GIS and bioremediation techniques in management of problematic soils. |
| CO6 | Explain the Land use pattern. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 9 | 1 | 8 |  |  |  | 18 |
| CO2 |  | 5 |  | 5 | 10 |  | 20 |
| CO3 | 17 | 7 | 2 | 8 |  |  | 34 |
| CO4 | 3 |  | 10 | 12 | 5 |  | 30 |
| CO5 | 9 |  | 7 |  |  |  | 16 |
| CO6 |  | 5 | 1 | 1 |  |  | 7 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOVEMBER 2023**

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| **Course Code** | **21AG2352** | **Duration** | **3hrs** |
| **Course Name** | **DISEASES OF FIELD AND HORTICULTURAL CROPS AND THEIR MANAGEMENT - I** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Pyriform conidia is produced by-------  a. Rice blast b. Sheath rot c. Brown spot d. Stem rot | | CO3 | U | 1 |
| 2. | Sorghum rust disease is caused by-------  a.Puccinia purpurea b. Sporisorium sorghi  c. Claviceps sorghi d. Colletotrichum graminicolum | | CO1 | A | 1 |
| 3. | Red gram sterility mosaic virus is transmitted by  a. Orosius albictnus b. Hismonus physiticus  c. Leveillula taurica d. Aceria cajani | | CO3 | An | 1 |
| 4. | Dark brown to black sunken circular spots with numerous minute black acervuli are seen in the centre of the lesions on the fully grown unripened fruits types of symptoms in guava produced by  a. Sooty mould b. Anthracnose c. Fusarium wilt d. Red rust | | CO2 | A | 1 |
| 5. | Bacterial blight of pomegranate is caused by  a. Xanthomonas axonopodis pv. punicae b. Cercospora punicae  c. Colleotrichum gloeosporioides d. Taphrina deformans | | CO1 | R | 1 |
| 6. | Powdery mildew of papaya is caused by  a.Pythium aphanidermatum b. Oidium caricae-papayae  c. Colletotrichum gloeosporioides d. Macrophomina phaseolina | | CO1 | U | 1 |
| 7. | Panama wilt of banana is caused by--------  a.Fusarium oxysporum f.sp. cubense b. Gloeosporium musarum  c. Mycosphaerella musicola d. Verticillium theobromae | | CO2 | R | 1 |
| 8. | Bean anthracnose is caused by \_\_\_\_\_\_\_\_\_  a. Colletotrichum lindemuthianum b. Rhizoctonia solani  c. Uromyces appendiculaters d. Xanthomonas campestris pv phaseoli | | CO1 | R | 1 |
| 9. | Leaf blotch disease of ginger is caused by \_\_\_\_\_\_\_\_  a. Taphrina maculans b. Cercospora punicae  c. Leveillula taurica d. Colletotrichum gingiberis | | CO2 | U | 1 |
| 10. | Coffee leaf rust is caused by \_\_\_\_\_\_\_\_\_  a.Rhizactonia solani b. Cercospora coffeicola  c. Capnodium braziliense d. Hemileia vastatrix | | CO4 | An | 1 |
| 11. | Khaira disease of rice caused by due to----------- deficiency. | | CO4 | An | 1 |
| 12. | Dark brown circular spots without yellow halo appear on the lower surface of the leaf in groundnut is symptoms of---------------- | | CO2 | A | 1 |
| 13. | Papaya ring spot virus transmitted by------- | | CO5 | A | 1 |
| 14. | Brinjal little leaf virus transmitted by------- | | CO6 | E | 1 |
| 15. | Small brown scabby lesions surrounded by white halo appear on the fruits which resembles the bird’s eye symptoms in tomato produced by------ | | CO6 | A | 1 |
| 16. | Bhendi yellow vein mosaic virus transmitted by--------- | | CO5 | U | 1 |
| 17. | “Kresek” symptoms produced by --------- disease in rice. | | CO4 | E | 1 |
| 18. | Stem bleeding disease of coconut is caused by------------ | | CO5 | E | 1 |
| 19. | Gingelly phyllody is transmitted by---------- | | CO4 | U | 1 |
| 20. | Club root of cabbage disease is caused by------ | | CO6 | R | 1 |
| PART – B (10 X 5 = 50 MARKS)  (Answer any 10 from the following) | | | | | |
| 21. | Write the IDM practices for rice blast disease. | | CO5 | C | 5 |
| 22. | Explain the symptoms and pathogen characteristics of sorghum downy mildew disease. | | CO3 | R | 5 |
| 23. | Describe the symptoms and pathogen character of red gram powdery mildew disease. | | CO2 | R | 5 |
| 24. | Illustrate the symptoms and management of Phytophthora blight in caster. | | CO5 | An | 5 |
| 25. | Write the symptoms, mode of spread, and management of Peanut spotted wilt disease. | | CO6 | C | 5 |
| 26. | Summarize the symptoms and management of wildfire in tobacco. | | CO5 | U | 5 |
| 27. | Describe the symptoms and IDM practices of Panama wilt in bananas. | | CO6 | R | 5 |
| 28. | Illustrate the symptoms, mode of spread, and management of anthracnose in papaya. | | CO2 | An | 5 |
| 29. | Write the symptoms, favorable conditions, mode of spread, and management of Brinjal Phomopsis blight. | | CO3 | C | 5 |
| 30. | Explain the symptoms and management of Bhendi vein-clearing disease. | | CO5 | R | 5 |
| 31. | Describe symptoms, mode of spread, and management of soft rot in ginger. | | CO5 | R | 5 |
| 32. | Summarize the symptoms and management of coffee leaf rust disease. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List out diseases of rice and explain bacterial disease. | CO3 | A | 8 |
|  | b. | Describe important diseases in tobacco. | CO2 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain any five important diseases in papaya. | CO5 | U | 7 |
|  | b. | Elaborate the Banana viral diseases. | CO6 | An | 8 |
|  |  |  |  |  |  |
| 35. | a. | Describe any five important fungal diseases in sorghum. | CO4 | R | 8 |
|  | b. | Explain important diseases in cruciferous vegetables. | CO5 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall various plant pathological terms and basic concepts of important plant diseases |
| CO2 | Explain the disease symptoms of various plant diseases of field and horticultural crops |
| CO3 | Interpret the host-pathogen interaction on disease development in field and horticultural crops |
| CO4 | Determine the prevalence, epidemiology, and factors affecting disease development |
| CO5 | Apply integrated management practices to control diseases of field and horticultural crops |
| CO6 | Recommend management practices for different diseases of different crop plants |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 1 | 1 | - | - | - | 4 |
| CO2 | 13 | 1 | 2 | 5 | - | - | 21 |
| CO3 | 5 | 1 | 8 | 1 | - | 5 | 20 |
| CO4 | 8 | 1 | - | 2 | 1 | - | 12 |
| CO5 | 17 | 13 | 1 | 5 | 1 | 5 | 42 |
| CO6 | 11 | - | 1 | 8 | 1 | 5 | 26 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2354** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF INTEGRATED PEST AND DISEASE MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define IPM. | | CO1 | U | 1 |
| 2. | Discuss the three types of disease surveillance reports. | | CO2 | R | 1 |
| 3. | Define Economic Injury level. | | CO1 | U | 1 |
| 4. | List out any four Invasive pest’s species introduced into India. | | CO2 | A | 1 |
| 5. | Brief about the toxicity levels of Pesticides. | | CO6 | An | 1 |
| 6. | How is the Tetrazolium chloride test done for the selection of disease-free planting materials? | | CO2 | An | 1 |
| 7. | Write about Wet seed treatment. | | CO5 | A | 1 |
| 8. | Discuss the use of yellow sticky traps in IPM. | | CO4 | E | 1 |
| 9. | What are the uses of the Cross Protection Technique in IDM? | | CO3 | R | 1 |
| 10. | List out any four cultural practices in disease management with examples. | | CO3 | An | 1 |
| 11. | Define the Mechanical method of Pest control with any two examples. | | CO4 | C | 1 |
| 12. | Define AUDPC. | | CO5 | R | 1 |
| 13. | Differentiate Antisporulant and Antipenetrant. | | CO3 | An | 1 |
| 14. | What are the ideal qualities of an ideal Fungicide? | | CO6 | U | 1 |
| 15. | Brief about the mode of action of copper fungicides. | | CO3 | R | 1 |
| 16. | Explain about Phytosanitary certificate. | | CO4 | A | 1 |
| 17. | Discuss the role of viruses in pest management with an example. | | CO4 | C | 1 |
| 18. | Differentiate major and minor pests. | | CO2 | A | 1 |
| 19. | What is Plant Quarantine? | | CO4 | C | 1 |
| 20. | Commercial formulations of *Bacillus thuringiensis* against insects. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write in brief about the mode of action of Organochlorines. | | CO4 | R | 5 |
| 22. | Explain the following fungicide formulations with examples.   1. 1. Emulsifiable concentrate 2. Wettable powders | | CO6 | A | 5 |
| 23. | Discuss the following Fungicide application techniques.  1. Root Feeding 2. Paring and Pralinage 3. Pseudostem Injection | | CO3 | An | 5 |
| 24. | Classify the insecticides based on the mode of entry and mode of action. | | CO4 | U | 5 |
| 25. | Discuss the effect of sunlight and hot water treatment for protection against diseases. | | CO3 | An | 5 |
| 26. | Elaborate the role of parasitoids and predators in IPM. | | CO4 | A | 5 |
| 27. | Explain the uses and the methods of preparation of Bordeaux mixture. | | CO5 | E | 5 |
| 28. | Explain about the different generations of fungicides. | | CO6 | R | 5 |
| 29. | Elaborate the uses and application of ecological engineering in Insect pest management. | | CO4 | E | 5 |
| 30. | Discuss the objectives of pest surveillance and the different types of surveys. | | CO2 | U | 5 |
| 31. | Explain in brief about the Boom-and-Bust Cycle. | | CO1 | C | 5 |
| 32. | Elaborate the mechanisms of disease resistance with examples. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the parameters of Insect population levels and list out the causes of pest’s outbreaks. | CO1 | An | 7.5 |
|  | b. | Write in detail about Host Plant Resistance. | CO4 | E | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Classify plant diseases based on the type of infection, type of perpetuation and spread extent of occurrence, and geographic distribution. | CO2 | A | 7.5 |
|  | b. | Discuss the IPM Module for soil-borne and air-borne diseases. | CO5 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss any five toxicity parameters and ideal qualities of pesticides. | CO6 | U | 7.5 |
|  | b. | What are the Mechanisms involved in the biological control of plant diseases? | CO3 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Concepts and principles of IPM |
| CO2 | Detection and diagnosis of pests and diseases, Survey surveillance, and forecasting of Insect pests and diseases. |
| CO3 | Integrated diseases management |
| CO4 | Integrated Pest management |
| CO5 | Implementation and impact of IPM |
| CO6 | Pesticides, Fungicides, and Safe Handling |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 2 | - | 7.5 | - | 5 | 14.5 |
| CO2 | 1 | 5 | 9.5 | 1 | - | - | 16.5 |
| CO3 | 2 | 5 | 7.5 | 12 | 7.5 | - | 34 |
| CO4 | 5 | 5 | 6 | - | 6 | 3 | 25 |
| CO5 | 2 | - | 1 | 7.5 | 5 | - | 15.5 |
| CO6 | 5 | 8.5 | 5 | 1 | - | - | 19.5 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG2401** | **Duration** | **3hrs** |
| **Course Name** | **LIVESTOCK AND POULTRY MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | In total livestock population goat contributes\_\_\_\_\_\_\_  a. 28% b. 36% c. 20% d. 14% | | CO1 | R | 1 |
| 2. | Total buffalo breeds in India\_\_\_\_\_\_\_  a.13 b. 23 c. 33 d. 11 | | CO1 | R | 1 |
| 3. | What is Artificial Insemination? | | CO3 | U | 1 |
| 4. | Define Integrated Farming System. | | CO1 | U | 1 |
| 5. | Write the Signs of estrus/heat. | | CO3 | U | 1 |
| 6. | Which of the following exotic cattle breeds have the highest fat percentage?  a..Guernsey b. Holstein Friesian (HF) c. Jersey d. Ayrshire | | CO2 | R | 1 |
| 7. | One of the best draught breeds of Tamil nadu \_\_\_\_\_\_\_\_  a. Kangayam b. Bargur c. Pulikulam d. Umblachery | | CO2 | R | 1 |
| 8. | Breeding of closely related animals is called \_\_\_\_\_\_\_  a. Outcrossing b. Inbreeding c. Upgrading d. Back crossing | | CO3 | R | 1 |
| 9. | List out the diseases of swine. | | CO6 | R | 1 |
| 10. | Define cannibalism. | | CO2 | U | 1 |
| 11. | List out the types of fodder. | | CO4 | R | 1 |
| 12. | Define culling. | | CO3 | U | 1 |
| 13. | The special feed for young one of pigs called\_\_\_\_\_\_\_  a. Swill feed b. Creep feed c. Piglet feed d. Flushing | | CO4 | R | 1 |
| 14. | Separation of the calf from the mother after parturition is known as\_\_\_\_\_\_\_  a. Culling b. Calving c. Weaning d. Lacatating | | CO3 | R | 1 |
| 15. | Ketosis occurs mostly in high demand of \_\_\_\_\_\_\_\_\_\_  a. Magnesium b. Iron c. Calcium d. Glucose | | CO6 | R | 1 |
| 16. | The breeding age of boar\_\_\_\_\_\_years  a. 2.5 b. 1 c. 1.5 d. 2 | | CO2 | R | 1 |
| 17. | Scientific name of Indigenous cattle\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a. *Bos indicus* b. *Bos taurus* c. *Capra hircus* d. *Ovis aries* | | CO2 | R | 1 |
| 18. | Colostrum contains\_\_\_\_\_\_\_\_  a. Low mineral b. Hight protein c. High fat d. Low vitamins | | CO2 | R | 1 |
| 19. | Inbreeding increases\_\_\_\_\_\_\_\_  a. Homozygocity b.Heterozygocity c. Hybrid vigour d. Grading | | CO3 | R | 1 |
| 20. | In AMUL which buffalo breed is frequently used\_\_\_\_\_\_\_  a. Surthi b. Murrah c. Nili-Ravi d. Bhadawari | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the care and management of dry cows. | | CO3 | U | 5 |
| 22. | Write the classification of swine breeds and discuss any two diseases. | | CO6 | U | 5 |
| 23. | Explain about Embryo transfer technique with its merits and demerits. | | CO3 | U | 5 |
| 24. | Describe clean milk production and its importance. | | CO3 | U | 5 |
| 25. | Briefly discuss the characteristics of Jersey and Holstein Friesian. | | CO2 | U | 5 |
| 26. | Explain the care and management of broilers. | | CO3 | U | 5 |
| 27. | Write a detailed note on the Incubation and hatching of eggs. | | CO3 | U | 5 |
| 28. | Write about the viral, bacterial, and protozoan of poultry. Write its causative organisms, symptoms, and prevention. | | CO6 | U | 5 |
| 29. | Write the vaccination schedule for growers and layers. | | CO6 | U | 5 |
| 30. | Explain about various systems of livestock production. | | CO2 | U | 5 |
| 31. | Write a detailed note on the deep litter and cage system. | | CO5 | U | 5 |
| 32. | Explain the systems of housing in cattle farming. Write its merits and demerits. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the classification of feeding stuff. | CO4 | U | 8 |
|  | b. | Describe the importance of green leaf fodder. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the classification of Indian and exotic breeds of goat. | CO2 | U | 7.5 |
|  | b. | Write about the viral and bacterial diseases of goats and sheep. Write its causative organisms, symptoms, and prevention. | CO6 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Compare Economic Traits between Local, Exotic, and Crossbred cattle. | CO2 | An | 8 |
|  | b. | Write a detailed note on silage-making. | CO4 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Know the importance of farm animals and their influence in the rural economy |
| CO2 | Distinguish characteristics of indigenous and exotic breeds of cattle, goats, buffalo, swine, and poultry. |
| CO3 | Select quality breeds and poultry and improve livestock on a farm. |
| CO4 | Choose nutritious feed rations and feed animals and poultry. |
| CO5 | Set up proper housing for the farm animals and poultry. |
| CO6 | Manage farm animal diseases, young ones, and their products – milk, meat, and egg. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | - | - | - | - | - | 4 |
| CO2 | 5 | 18.5, | - | 8 | - | - | 31.5 |
| CO3 | 3 | 2 | - | - | - | - | 31 |
| CO4 | 2 | 22 | - | - | - | - | 24 |
| CO5 | - | 10 | - | - | - | - | 10 |
| CO6 | 2 | 22.5 | - | - | - | - | 24.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2551** | **Duration** | **3hrs** |
| **Course Name** | **AGRI INFORMATICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define e-Agriculture. | | CO1 | U | 1 |
| 2. | What is Model-driven DSS? | | CO6 | C | 1 |
| 3. | Define expert system. | | CO6 | U | 1 |
| 4. | What do you know about the Inference engine? | | CO6 | A | 1 |
| 5. | List any two pros of the expert system. | | CO6 | E | 1 |
| 6. | Compare model and simulation. | | CO3 | A | 1 |
| 7. | Define sensors. | | CO4 | A | 1 |
| 8. | Which unmanned aircraft is used in agriculture? | | CO5 | A | 1 |
| 9. | What is drone mapping? | | CO5 | E | 1 |
| 10. | Define DSS. | | CO6 | An | 1 |
| 11. | What is GPS in agriculture? | | CO2 | U | 1 |
| 12. | What is GEOGLAM? | | CO2 | An | 1 |
| 13. | What is a database? | | CO4 | R | 1 |
| 14. | Define climate model. | | CO3 | An | 1 |
| 15. | What is the use of GPS in land surveying? | | CO2 | C | 1 |
| 16. | How are wireless technologies used in agriculture? | | CO1 | U | 1 |
| 17. | How GIS is helpful in agriculture data analysis? | | CO2 | A | 1 |
| 18. | Define crop doctor. | | CO1 | E | 1 |
| 19. | List the use of smartphone mobile apps in agriculture. | | CO4 | An | 1 |
| 20. | Write advantages of ICT in agriculture. | | CO1 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List the components of e-Agriculture. | | CO1 | R | 5 |
| 22. | Write the role of smartphones in post-harvest management. | | CO4 | C | 5 |
| 23. | Briefly discuss the expert system and its uses in agriculture. | | CO6 | R | 5 |
| 24. | What is GIS? Explain any two uses of GIS. | | CO2 | E | 5 |
| 25. | Write down the practical application of sensors in agriculture. | | CO3 | R | 5 |
| 26. | Discuss the classification of decision support systems. | | CO6 | C | 5 |
| 27. | Explain practically the use of drones in soil and field analysis. | | CO5 | C | 5 |
| 28. | Write the role of ICT in agriculture | | CO1 | A | 5 |
| 29. | Write about mesoscale models. | | CO3 | U | 5 |
| 30. | List the agriculture sensors. | | CO5 | U | 5 |
| 31. | Explain how robots are used for irrigation monitoring and management | | CO5 | An | 5 |
| 32. | What is the role of smartphone apps in agriculture? | | CO4 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What are the ICT-enabled tools used for data collection? | CO1 | U | 7.5 |
|  | b. | Write the key features of the soil information system. | CO6 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write notes on smartphone mobile apps in agriculture. | CO4 | An | 7.5 |
|  | b. | Explain about geospatial technologies. | CO2 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss different types of computer-controlled devices in agri-input management. | CO5 | C | 7.5 |
|  | b. | Write notes on crop environment models. | CO3 | E | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the use of information, communication, and technology (ICT) in agriculture |
| CO2 | Demonstrate the use of GIS and GPS systems in precision agriculture |
| CO3 | Develop computerized models to understand the plant growth process |
| CO4 | Use smartphones in farm advisory farm pricing and post-harvest management. |
| CO5 | Manage input requirements for crops and animals |
| CO6 | Use Agriculture Expert system and Soil Information Systems for a firm decision. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 9.5 | 5 | 1 | 1 | 0 | 21.5 |
| CO2 | 0 | 1 | 8.5 | 1 | 5 | 1 | 16.5 |
| CO3 | 5 | 5 | 1 | 1 | 7.5 | 0 | 19.5 |
| CO4 | 1 | 0 | 1 | 8.5 | 5 | 5 | 20.5 |
| CO5 | 0 | 5 | 1 | 5 | 1 | 12.5 | 24.5 |
| CO6 | 5 | 1 | 8.5 | 1 | 1 | 6 | 22.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG2552** | **Duration** | **3hrs** |
| **Course Name** | **INTELLECTUAL PROPERTY RIGHTS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is IPR? | | CO1 | R | 1 |
| 2. | Where is the headquarters of WTO located? | | CO1 | R | 1 |
| 3. | Expand GATT. | | CO1 | R | 1 |
| 4. | Define Industrial design. | | CO2 | U | 1 |
| 5. | Define Copyrights. | | CO2 | U | 1 |
| 6. | What are plant breeder rights? | | CO4 | U | 1 |
| 7. | Expand WIPO. | | CO1 | R | 1 |
| 8. | Identify the importance of patents. | | CO3 | A | 1 |
| 9. | What is Madrid protocol related to? | | CO2 | U | 1 |
| 10. | Identify the benefits of GI. | | CO2 | A | 1 |
| 11. | Expand TRIPS. | | CO5 | R | 1 |
| 12. | What are trade secrets? | | CO3 | U | 1 |
| 13. | What is Plagiarism? | | CO4 | U | 1 |
| 14. | What is FR act? | | CO5 | R | 1 |
| 15. | When was the Biological Diversity Act introduced? | | CO6 | R | 1 |
| 16. | Expand PGR. | | CO3 | R | 1 |
| 17. | List out the works that can be patented. | | CO2 | R | 1 |
| 18. | What is compulsory licensing? | | CO4 | U | 1 |
| 19. | Write the meaning of the trademark. | | CO2 | U | 1 |
| 20. | What are farmer’s rights? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on Intellectual property rights. | | CO1 | R | 5 |
| 22. | Write short notes on the implications of WTO. | | CO1 | U | 5 |
| 23. | Write short notes on IPR protection. | | CO1 | U | 5 |
| 24. | Narrate the differences between trade secrets and patent. | | CO2 | An | 5 |
| 25. | Write short notes on plant genetic resources. | | CO3 | U | 5 |
| 26. | Outline the history and importance of UPOV. | | CO4 | R | 5 |
| 27. | Write short notes on Berne convention. | | CO2 | U | 5 |
| 28. | How to register plant varieties under PPV&FR? | | CO5 | A | 5 |
| 29. | Describe the procedure to file a patent. | | CO2 | An | 5 |
| 30. | Describe the types of intellectual properties. | | CO2 | R | 5 |
| 31. | Write short notes on the Budapest treaty. | | CO2 | R | 5 |
| 32. | Write short notes on traditional knowledge. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the role and functions of the WTO. | CO1 | U | 7.5 |
|  | b. | Explain the role, functions, and implications of GATT. | CO1 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write in detail about plant breeder’s rights. | CO3 | A | 7.5 |
|  | b. | Explain the procedural formalities in availing farmers’ rights. | CO4 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Summarize the role, importance, and procedural formalities of patent. | CO2 | An | 7.5 |
|  | b. | Explain about International treaty on plant genetic resources for food and agriculture. | CO6 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | COURSE OUTCOMES |
| CO1 | Understand GATT, WTO, TRIPs, and WIPO for IPR protection |
| CO2 | Know how to acquire the patent and copyright for their innovative work |
| CO3 | Remember plagiarism, which can be questioned legally |
| CO4 | Explain UPOV and PPV & FR Act of India |
| CO5 | Apply, Analyze, and use ITK strategies |
| CO6 | Achieve new innovative goals |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 9 | 25 | - | - | - | - | 34 |
| CO2 | 11 | 9 | 1 | 17.5 | - | - | 38.5 |
| CO3 | 1 | 6 | 8.5 | - | - | - | 15.5 |
| CO4 | 5 | 4 | 7.5 | - | - | - | 16.5 |
| CO5 | 2 | - | 5 | - | - | - | 7 |
| CO6 | 1 | 12.5 |  |  | - | - | 13.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3001** | **Duration** | **3hrs** |
| **Course Name** | **MODERN CONCEPTS IN CROP PRODUCTION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Why do we use fertilizer? | | CO1 | U | 1 |
| 2. | When the terminal portion of a branch or a shoot is removed partially, leaving the basal portion intact, it is called as  a) staking b) Thinning out 3) Heading back 4) Dehorning | | CO1 | R | 1 |
| 3. | What is the size of grid sampling? | | CO2 | U | 1 |
| 4. | Removal of dried and older leaves in sugarcane is called------- | | CO2 | R | 1 |
| 5. | The moisture content at which wilting is completed and the plant is dying is called------- | | CO3 | R | 1 |
| 6. | Which of the following is a rabi crop?  a. Rice b. Mustard c. Soyabean d. Maize | | CO1 | U | 1 |
| 7. | What is contingent planning? | | CO2 | U | 1 |
| 8. | Tubers appear green in color due to------- | | CO2 | A | 1 |
| 9. | Which fertilizer is highly hygroscopic?  a) Calcium ammonium nitrate b) Sodium nitrate c) Ammonium sulphate  d) Urea | | CO1 | U | 1 |
| 10. | Which crop rotation will be more remunerative under the dryland situation? | | CO3 | U | 1 |
| 11. | Which is the best complementary enterprise with the crop?  a) Livestock b) Poultry c)Fish d) Bees | | CO5 | R | 1 |
| 12. | The process of loosening and turning the soil is called-------- | | CO5 | R | 1 |
| 13. | Precision agriculture is also known as------ | | CO6 | R | 1 |
| 14. | Consider the following statements about weeding and identify the incorrect one  a. Weeding is best done during tilling itself  b. Weeding is the process of growing weed  c. Weeding is the process of removal of weeds  d. Weeding is usually done manually or by using weedicides | | CO4 | U | 1 |
| 15. | The instrument which is used for sowing of seed with fertilizer together at a time is---- | | CO4 | U | 1 |
| 16. | The nutrient concentration range in which added nutrients will not increase yield but can increase nutrient concentration is referred as--------- | | CO3 | A | 1 |
| 17. | Loss of water from the stomata of leaves is known as------- | | CO1 | U | 1 |
| 18. | What is the full form of IFM? | | CO2 | R | 1 |
| 19. | Which chemical accumulates during drought conditions? | | CO1 | R | 1 |
| 20. | What is evasion? | | CO5 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Briefly describe CGR. | | CO2 | An | 5 |
| 22. | Explain about management options to reduce lodging. | | CO2 | U | 5 |
| 23. | Discuss on Mitscherlich’s Equation. | | CO4 | R | 5 |
| 24. | Discuss Bray’s Nutrient Mobility Concept. | | CO5 | E | 5 |
| 25. | Discuss about the alley-cropping system. | | CO4 | A | 5 |
| 26. | Briefly explain about resource conservation equipment and technology. | | CO1 | E | 5 |
| 27. | What are all the basic principles that should be closely followed in organic agriculture? | | CO4 | U | 5 |
| 28. | Explain about components of Farming Systems. | | CO6 | R | 5 |
| 29. | Describe soil-plant relationship. | | CO3 | A | 5 |
| 30. | Define organic farming. Write short note on it. | | CO3 | U | 5 |
| 31. | Write short note on the movement of water in the soil. | | CO2 | E | 5 |
| 32. | Explain about planting pattern. | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Analyze problems or constraints of different agro-ecological zones. | CO5 | U | 7.5 |
|  | b. | Briefly describe precision farming. Explain why it’s needed. Write about the basic components of precision farming. | CO1 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Define soil water. How water is held in the soil? Classify soil water based on the function of water in soil. | CO3 | An | 8 |
|  | b. | Briefly discuss the factor of optimum plant population. | CO2 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain about yield and environmental stress. | CO4 | R | 7 |
|  | b. | Briefly describe organic farming. | CO6 | U | 8 |

CO – COURSE OUTCOME BL – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the crop production techniques and crop growth in relation to the environment. |
| CO2 | Address various factors affecting crop production and yield |
| CO3 | Know the effective ways of soil and nutrient management |
| CO4 | Recognize and identify effective ways to overcome the environmental stresses affecting crop  growth and yield |
| CO5 | Learn the ways for effective utilization of farm resources, diversification of crop productions and  maximizing the farm income |
| CO6 | Gain knowledge on new technologies and trends in agriculture for maximizing crop yield and  Farm income in a sustainable way |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | R | U | A | An | E | C | Total |
| CO1 | 9.5 | 4 |  |  | 5 |  | 18.5 |
| CO2 | 7 | 2 | 13 | 5 | 5 |  | 32 |
| CO3 | 1 | 6 | 6 | 8 |  |  | 21 |
| CO4 | 12 | 7 | 5 |  |  |  | 24 |
| CO5 | 2 | 8.5 |  |  | 5 |  | 15.5 |
| CO6 | 6 | 8 |  |  |  |  | 14 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3002** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES AND PRACTICES OF SOIL FERTILITY AND NUTRIENT MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the Scientists who proposed the following concepts.   1. Law of Minimum 2. Criteria of Essentiality | | CO 1 | A | 1 |
| 2. | Define Hidden hunger. | | CO 2 | U | 1 |
| 3. | Which nutrient is responsible for causing the following deficiency symptoms?   1. Khaira disease in Paddy 2. Button shedding in Coconut | | CO 1 | R | 1 |
| 4. | Name a deficiency symptom caused by the following nutrient,   1. Iron 2. Molybdenum | | CO 1 | R | 1 |
| 5. | Differentiate Mass flow and Diffusion. | | CO 2 | An | 1 |
| 6. | Define Chelation. | | CO 2 | U | 1 |
| 7. | Name the primary nutrients that govern the following functions in plants.   1. Vegetative growth 2. Root proliferation | | CO 1 | R | 1 |
| 8. | List out the Phosphorous fertilizers. | | CO 3 | R | 1 |
| 9. | Quote the Critical range of soil pH and EC. | | CO 3 | R | 1 |
| 10. | Differentiate Complete and Incomplete Complex fertilizers. | | CO 3 | An | 1 |
| 11. | Define Biofertilizers and state two examples. | | CO 3 | U | 1 |
| 12. | Furnish the classification of Organic Manures. | | CO 4 | U | 1 |
| 13. | Expand DRIS. | | CO 5 | R | 1 |
| 14. | The following analytical procedures are followed in the determination of which soil nutrient?   1. Alkaline Permanganate method by Subbiah and Asija 2. Olsen and Bray’s methods | | CO 5 | E | 1 |
| 15. | Name any two Microbiological methods followed in soil fertility evaluation | | CO 5 | A | 1 |
| 16. | Define Fertilizer Use Efficiency | | CO 6 | U | 1 |
| 17. | State the objectives of Soil testing | | CO 6 | E | 1 |
| 18. | What are the components of Integrated Nutrient Management (INM)? | | CO 5 | An | 1 |
| 19. | Which soil nutrient is determined by using the following instruments?   1. Flame Photometer 2. Atomic Absorption Spectrophotometer (AAS) | | CO 6 | C | 1 |
| 20. | Nitrogen, Phosphorous, Potassium and Sulphur are taken by plants in which ionic forms? | | CO 5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe soil fertility and soil productivity with its factors affecting in detail. | | CO 2 | U | 5 |
| 22. | Explain the phosphorous transformation in soil with a neat sketch. | | CO 1 | U | 5 |
| 23. | Discuss in detail the Sulphur transformation in soil with a neat sketch. | | CO 1 | A | 5 |
| 24. | Illustrate the Nutrient Transport Mechanism in soil with neat sketches. | | CO 2 | A | 5 |
| 25. | Quote the Critical limit/range of all the essential nutrients. | | CO 6 | R | 5 |
| 26. | Compile in detail about the Fertilizer Control Order. | | CO 3 | C | 5 |
| 27. | Write the classification of Nitrogen fertilizers with examples. | | CO 3 | U | 5 |
| 28. | Compare and discuss different nutrient management concepts. | | CO 5 | E | 5 |
| 29. | Discuss the Nutrient Recommendation approaches in detail. | | CO 5 | An | 5 |
| 30. | Describe the different methods of fertilizer application in detail. | | CO 3 | A | 5 |
| 31. | Write in detail about Soil amendments and Nano fertilizers. | | CO 3 | A | 5 |
| 32. | Compare and discuss about Green Manuring and Green Leaf Manuring. | | CO 4 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List out the essential elements and furnish their functions and deficiency symptoms in detail with suitable examples. | CO 2 | R | 10 |
|  | b. | Draw the plant growth/yield curve and explain its terms. | CO 1 | An | 5 |
|  |  |  |  |  |  |
| 34. | a. | Describe the Nitrogen transformation in soil with a neat sketch. | CO 3 | A | 10 |
|  | b. | Write in detail the different methods of composting. | CO 4 | U | 5 |
|  |  |  |  |  |  |
| 35. | a. | Summarize the details related to Soil Fertility Evaluation. | CO 6 | E | 10 |
|  | b. | Discuss the strategies used in improving Nutrient Use Efficiency (NUE). | CO 5 | C | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the importance of soil fertility management and crop growth |
| CO2 | Know the role of various nutrients in crop growth, development, and yield |
| CO3 | Recognize the composition of various chemical fertilizers and could recognize its impact on crop production |
| CO4 | Derive a thorough knowledge on various organic manure productions and its applications |
| CO5 | Develop a holistic knowledge on sustainable nutrient management practices for sound farming ecosystem |
| CO6 | Learn the methodologies for determining the soil nutrient levels and the crop nutrient uptake |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 5 | 6 | 5 | - | - | 19 |
| CO2 | 10 | 7 | 5 | 1 | - | - | 23 |
| CO3 | 2 | 6 | 20 | 1 | - | 5 | 34 |
| CO4 | - | 6 | - | 5 | - | - | 11 |
| CO5 | 2 | - | 1 | 6 | 6 | 5 | 20 |
| CO6 | 5 | 1 | - | - | 11 | 1 | 18 |
|  | 22 | 25 | 32 | 18 | 17 | 11 | **125** |



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| **Course Code** | **21AG3005** | **Duration** | **3hrs** |
| **Course Name** | **AGRO-METEOROLOGY AND CROP WEATHER FORECASTING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The National Remote Sensing Agency is situated at \_\_\_\_\_\_\_\_\_. | | CO1 | R | 1 |
| 2. | The word Monsoon is an \_\_\_\_\_ | | CO1 | U | 1 |
| 3. | What is the size of the average raindrop in diameter? | | CO3 | U | 1 |
| 4. | The optimum temperature for better crop production is……….. | | CO2 | R | 1 |
| 5. | Who is related to the classification of climate? | | CO2 | R | 1 |
| 6. | Isobar is......... | | CO3 | A | 1 |
| 7. | Albedo is an energy……… | | CO3 | R | 1 |
| 8. | The date of onset of monsoon in India is............ | | CO1 | U | 1 |
| 9. | The Indian Meteorological Department is situated in ------ | | CO1 | U | 1 |
| 10. | The wind vane is used to determine……… | | CO2 | R | 1 |
| 11. | Pluvimeter is called as------- | | CO4 | R | 1 |
| 12. | Generally, a wind vane should be kept............ | | CO4 | U | 1 |
| 13. | Barometer measures............. | | CO5 | U | 1 |
| 14. | Which is the rainy cloud? | | CO2 | A | 1 |
| 15. | The mean sea level pressure is............. | | CO5 | U | 1 |
| 16. | The warm and cold cloud seeding agent is………. | | CO6 | R | 1 |
| 17. | Forecast based on -----and----are important for agriculture. | | CO6 | R | 1 |
| 18. | The weather phenomena rain, occurs in…….. | | CO1 | U | 1 |
| 19. | The medium-range weather forecasting is done for............ | | CO2 | U | 1 |
| 20. | Which types of weather forecasting helps in determining cropping pattern? | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write a short note on the scope of agricultural meteorology. | | CO3 | U | 5 |
| 22. | Define weather and climate. | | CO5 | A | 5 |
| 23. | Discuss the exploitation of solar radiation in crop production. | | CO4 | An | 5 |
| 24. | Write a short note on light intensity. | | CO2 | E | 5 |
| 25. | Describe conduction and convection. | | CO1 | E | 5 |
| 26. | State the importance of growing degree day concept. | | CO1 | A | 5 |
| 27. | Write short notes on types of weather forecasts. | | CO2 | R | 5 |
| 28. | Write the role of Remote Sensing in Agriculture. | | CO3 | E | 5 |
| 29. | Define Precipitation. | | CO3 | R | 5 |
| 30. | Describe the special agricultural weather forecasts for the control of noxious weeds. | | CO4 | U | 5 |
| 31. | Write short notes on scales of climate and their importance. | | CO4 | U | 5 |
| 32. | List out the elements of agricultural weather forecasts. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss weather variables. | CO2 | A | 8 |
|  | b. | Explain about the role of temperature in crop production. | CO3 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define remote sensing and its uses in agriculture. | CO4 | E | 7 |
|  | b. | Write the importance of humidity on crop plants. | CO2 | R | 8 |
|  |  |  |  |  |  |
| 35. | a. | Define weather forecast and its importance in agriculture. | CO5 | E | 8 |
|  | b. | Explain climate change mitigation and adaptation in agriculture. | CO4 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the significance of agricultural meteorology, climate, and weather. |
| CO2 | Know the various atmospheric weather variables and their significance in crop production. |
| CO3 | Perceive crop weather relationships for efficient crop production. |
| CO4 | Acquire knowledge of weather forecasting techniques. |
| CO5 | Gains hands-on knowledge of the functioning of agro-meteorological observatory. |
| CO6 | Address the effect of climate change on crop production. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | 4 | 5 |  | 5 |  | 15 |
| CO2 | 16 | 1 | 9 |  | 5 |  | 31 |
| CO3 | 7 | 6 | 1 | 7 | 5 |  | 26 |
| CO4 | 1 | 11 | 7 | 5 | 7 |  | 31 |
| CO5 |  | 2 | 5 |  | 8 |  | 15 |
| CO6 | 7 |  |  |  |  |  | 7 |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG3006** | **Duration** | **3hrs** |
| **Course Name** | **CROPPING SYSTEMS AND SUSTAINABLE AGRICULTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Which is a cover crop?  a) Maize b)Cowpea c) Redgram d) All of the above | | CO1 | U | 1 |
| 2. | The farm wastes are better recycled for productive purposes in which type of farming system?  a) Specialized Farming System b) Integrated Farming System c) Diversified Farming System d) Both A and B | | CO1 | R | 1 |
| 3. | In Diversified Farming, no source of income equals as much as …………. % in total income.  a) 25% b) 50% c) 75% d) 35% | | CO2 | An | 1 |
| 4. | Which is the suitable stage of green manure crop for incorporation in the field? | | CO2 | A | 1 |
| 5. | -------type of farming is suitable for growing rice, jute and sugarcane. | | CO2 | U | 1 |
| 6. | Farming System is a…  a) Atomistic approach b) Individual approach c) Holistic approach d) Both B and C | | CO3 | R | 1 |
| 7. | A diversified farming system is otherwise known as  a) IFS B) Specialized farming c) Organic farming d) Ranching Farming | | CO1 | R | 1 |
| 8. | Which is not an element of sustainable agriculture?  a) Agroforestry b) Crop rotation c) Permaculture d) Permanent use of pesticides in farming | | CO3 | E | 1 |
| 9. | Soil potentiality can be increased by  a) Inorganic Fertilizers b) Organic c) Intensified Irrigation d) All of the above | | CO1 | U | 1 |
| 10. | Suggest the best-allied enterprise to the farmers, when the main crop is grown in rice.  a) Apiculture b) Sericulture c) Fishery d) Biogas | | CO2 | R | 1 |
| 11. | Growing two or more crops on the same piece of land simultaneously with a definite Row pattern is \_\_\_\_\_\_\_\_.  a) Relay Cropping b) Sequence Cropping c) Intercropping d) Mix Cropping | | CO1 | U | 1 |
| 12. | Which colour is associated with the revolution in fertilizer? | | CO1 | U | 1 |
| 13. | Golden fibre refers to------ | | CO1 | U | 1 |
| 14. | Which of the following is not a component of IFS?  a) Olericulture b) Specialized Farming c) Fencing d) Sericulture | | CO2 | R | 1 |
| 15. | Which of the crops are grown together to increase the production capacity of major crops? | | CO2 | R | 1 |
| 16. | Good, healthy seeds when put in water then they-------- | | CO1 | R | 1 |
| 17. | The farming system is which kind of enterprise among the following?  a) Dependent Enterprise b) Independent Enterprise c) Both A and B c)None of the Above | | CO3 | U | 1 |
| 18. | IFS leads to  a) Low Benefit-Cost Ratio b) High Benefit-Cost Ratio c) Both A and B d) None of the Above | | CO3 | U | 1 |
| 19. | ----------is a temperate crop. | | CO2 | U | 1 |
| 20. | Which one of the following characteristics is best suited to intensive farming?  a) Large farm size b) Low labour input c) High yield rate d) Sparsely populated region | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write a short note about alley cropping. | | CO3 | U | 5 |
| 22. | Explain about agro-ecosystem. | | CO1 | An | 5 |
| 23. | Explain in brief plant interactions and its types. | | CO1 | A | 5 |
| 24. | Explain the role of manures in soil fertility management with suitable examples. | | CO2 | R | 5 |
| 25. | Write short notes on LEISA. | | CO4 | R | 5 |
| 26. | Describe crop productivity as an indicator of sustainability. | | CO4 | U | 5 |
| 27. | Discuss the pests and diseases found in the intercropping system. | | CO5 | An | 5 |
| 28. | Explain plant growth regulators and their role in sustainability. | | CO1 | E | 5 |
| 29. | Enlist the major driving forces for crop diversification. | | CO5 | E | 5 |
| 30. | Discuss the yield advantage in intercropping with examples. | | CO3 | An | 5 |
| 31. | Define allelopathy and its effect on crops. | | CO6 | R | 5 |
| 32. | Explain the importance of crop residue management in agriculture. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss in brief the commercial application of plant growth regulators in agriculture. | CO1 | A | 7 |
|  | b. | Explain the concept of sustainability in the cropping system and farming systems, the scope and objective. | CO3 | An | 8 |
|  |  |  |  |  |  |
| 34. | a. | Explain the role of non-monetary inputs and low-cost technologies. | CO5 | E | 7.5 |
|  | b. | Discuss the globalization and emerging technologies for crop diversification. | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Describe in detail the interaction in sequence cropping. | CO2 | U | 8 |
|  | b. | Discuss plant ideotype for dryland farming. | CO4 | E | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand different cropping systems and ways to effectively manage resources under different  cropping systems |
| CO2 | Develop deep insights on crop interactions under cropping systems |
| CO3 | Gain knowledge on the importance of sustainable agriculture |
| CO4 | Relate sustainable agriculture with conventional agriculture in a scientific manner |
| CO5 | Imbibe knowledge of the importance of crop diversification and the sustainability of farm  Operations |
| CO6 | Apply the knowledge of sustainable crop production in effectively guiding farmers |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 6 | 12 | 5 | 5 |  | 32 |
| CO2 | 8 | 9 | 1 | 1 |  |  | 19 |
| CO3 | 1 | 7 | 13 | 1 |  |  | 22 |
| CO4 | 12.5 | 5 |  |  | 7 |  | 24.5 |
| CO5 |  |  |  | 5 | 12.5 |  | 17.5 |
| CO6 | 5 | 5 |  |  |  |  | 10 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3008** | **Duration** | **3hrs** |
| **Course Name** | **AGRONOMY OF MAJOR CEREALS AND PULSES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Protein % in wheat is \_\_\_\_\_\_\_\_ . | | CO2 | R | 1 |
| 2. | **The place of origin of red gram is** \_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Weeding is best done during the vegetative growth of weeds \_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 4. | In jute growing areas, the usual alternate crop is \_\_\_\_\_\_\_\_ | | CO3 | U | 1 |
| 5. | Chickpea is also called as \_\_\_\_\_\_\_\_ | | CO4 | A | 1 |
| 6. | The crop grown for grain, green manure, and fodder is \_\_\_\_\_\_\_\_ | | CO4 | U | 1 |
| 7. | Volatilization of ammonia in soil increases with the increase in \_\_\_\_\_\_\_\_ | | CO3 | R | 1 |
| 8. | **‘Bahar’ is a popular variety of** \_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 9. | Crop grown to protect the main crop from vagaries of nature and also to render support to the crop is called \_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 10. | International Rice Research Institute is located in \_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 11. | **The Rabi crops are sown in which months?** | | CO6 | R | 1 |
| 12. | Boro rice is called as \_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 13. | **The type of crop which is able to fix nitrogen from air is** \_\_\_\_\_\_\_\_ | | CO5 | U | 1 |
| 14. | The most critical stage for irrigation in the wheat crop is \_\_\_\_\_\_\_\_ | | CO4 | A | 1 |
| 15. | Mycoherbicides are the formulation of \_\_\_\_\_\_\_\_ | | CO3 | R | 1 |
| 16. | Lemma + palea together called as \_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 17. | SRI concept is increasing the productivity of rice by changing management\_\_\_\_\_\_ | | CO2 | R | 1 |
| 18. | Rice blast disease is caused by\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 19. | Pea fruit is known as \_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 20. | Weed in lentils can be controlled by applying \_\_\_\_\_\_\_\_\_\_. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Classify different types of maize with common names and botanical names. | | CO1 | R | 5 |
| 22. | Explain about different types of rice nursery. | | CO2 | A | 5 |
| 23. | Classify barley. | | CO1 | An | 5 |
| 24. | Discuss the cropping system of maize. | | CO3 | R | 5 |
| 25. | What are the different types of wheat? Explain it with a suitable example. | | CO3 | E | 5 |
| 26. | Write shorts on the history of rice in India. | | CO3 | R | 5 |
| 27. | Explain about transplantation shock. | | CO5 | An | 5 |
| 28. | Write a short note about the seed treatment of cowpea. | | CO5 | E | 5 |
| 29. | Discuss the maturity symptoms of important cereals and pulse crop. | | CO6 | E | 5 |
| 30. | What is nipping? Why nipping is important? | | CO4 | E | 5 |
| 31. | Explain about rice ecosystem. | | CO3 | U | 5 |
| 32. | Explain the criteria for harvesting crop. | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the agronomic cultivation package and practices of finger millet. | CO2 | R | 8 |
|  | b. | Discuss the principle of crop rotation. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the different sowing methods and their merits and limitations. | CO5 | A | 7 |
|  | b. | Discuss the causes for low production of pulses. | CO6 | An | 8 |
|  |  |  |  |  |  |
| 35. | a. | Write agronomic crop management package and practices of black gram crop. | CO6 | E | 7 |
|  | b. | Define SRI. What are the major advantages and disadvantages of SRI? | CO3 | A | 8 |

CO – COURSE OUTCOME BL – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the geographical distribution, varietal improvements, and adaptability of major |
| CO2 | cereals and pulses cultivated in India |
| CO3 | Acquire knowledge of crop production technologies for rabi cereals. |
| CO4 | Perceive knowledge on crop production technologies for kharif cereals. |
| CO5 | Manage the crop production technologies for rabi pulses. |
| CO6 | Work out the crop production technologies for Kharif pulses. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | R | U | A | An | E | C | Total |
| CO1 | 7 | 3 |  | 5 |  |  | 15 |
| CO2 | 11 |  | 5 |  |  |  | 16 |
| CO3 | 12 | 6 | 8 |  | 5 |  | 31 |
| CO4 | 5 | 9 | 2 |  | 5 |  | 21 |
| CO5 | 1 | 1 | 7 | 13 | 5 |  | 27 |
| CO6 | 3 |  |  |  | 12 |  | 15 |
|  | | | | | | | 125 |



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| --- | --- | --- | --- |
| **Course Code** | **21AG3009** | **Duration** | **3hrs** |
| **Course Name** | **AGRONOMY OF OILSEED, FIBER AND SUGAR CROPS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Origin of groundnut\_\_\_\_\_\_\_\_\_\_\_  a. UK b. North America c. South America d. Central America | | CO1 | R | 1 |
| 2. | Write the soil requirement for safflower. | | CO2 | U | 1 |
| 3. | Queen of oilseeds\_\_\_\_\_\_\_\_\_\_\_\_\_  a. Safflower b. Sunflower c. Sesame d. Groundnut | | CO1 | R | 1 |
| 4. | Define ratooning. | | CO5 | U | 1 |
| 5. | Write the byproducts in the sugarcane industry. | | CO5 | U | 1 |
| 6. | Seed rate for mustard\_\_\_\_\_\_\_\_\_\_\_  a. 1 to 2 kg/ha b. 3 to 4 kg/ha c. 5 to 7 kg/ha d. 8-10 kg/ha | | CO2 | R | 1 |
| 7. | Directorate of mustard research located at\_\_\_\_\_\_\_\_\_\_\_  a. Ajmer b. Jaipur c. Bharathpur d. Bikaner | | CO2 | R | 1 |
| 8. | Total water requirement for rapeseed and mustard\_\_\_\_\_\_\_\_mm  a. 400 b. 300 c. 600 d. 500 | | CO2 | R | 1 |
| 9. | Oilseeds research station located at\_\_\_\_\_\_\_\_\_  a. Villupuram b. Tiruvannamalai c. Tindivanam d. Cuddalore | | CO3 | R | 1 |
| 10. | Sugarcane breeding institute is located at\_\_\_\_\_\_\_\_\_\_  a. Dindigul b. Cuddalore c. Coimbatore d. Madurai | | CO5 | R | 1 |
| 11. | Write weed management practices for groundnut. | | CO3 | R | 1 |
| 12. | List out the important varieties of sunflower. | | CO3 | R | 1 |
| 13. | How will you control flowering (arrowing) in sugarcane? | | CO5 | R | 1 |
| 14. | Chip buds required for sugarcane cultivation\_\_\_\_\_\_\_\_\_\_/ha.  a. 10000 b. 5000 c. 12500 d. 15000 | | CO5 | R | 1 |
| 15. | Seed rate recommended for sunflower\_\_\_\_\_\_\_\_\_\_\_kg/ha.  a. 3-5 b. 8-10 c.10-15 d. 20-25 | | CO3 | R | 1 |
| 16. | Scientific name of linseed\_\_\_\_\_\_\_\_\_\_  a. *Arachis hypogea* b*. Helianthus annuus* c. *Linum usitatissium* d. *carthamus tinctorius* | | CO2 | R | 1 |
| 17. | King of oilseeds\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a. Safflower b. Sunflower c. Sesame d. Groundnut | | CO1 | R | 1 |
| 18. | What is retting? | | CO4 | R | 1 |
| 19. | Spacing recommended for hybrid sunflower\_\_\_\_\_\_\_  a. 60x20cm b. 30x15cm c. 60x30cm d. 60x45cm | | CO3 | R | 1 |
| 20. | Seed rate recommended for sesame\_\_\_\_\_\_\_\_\_kg/ha  a. 5 b. 20 c. 15 d. 10 | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the importance of biofertilizers. Write the objectives of seed treatment. | | CO1 | U | 5 |
| 22. | Explain the gur (Jaggery) manufacturing process. | | CO5 | U | 5 |
| 23. | Compare conventional and SSI methods of sugarcane cultivation. | | CO5 | An | 5 |
| 24. | Write the production technology of linseed. | | CO2 | An | 5 |
| 25. | Write the package of practices of sunflowers. | | CO3 | U | 5 |
| 26. | Write the suitable cropping system for the castor. List out the important varieties. | | CO3 | U | 5 |
| 27. | Describe important cultural operations in sugarcane. | | CO5 | U | 5 |
| 28. | Write the production technology of sugarbeet. | | CO5 | U | 5 |
| 29. | Define plant population. Calculate the plant population for sunflowers.  i) Area-2 ha ii) Spacing-60x30cm. | | CO3 | C | 5 |
| 30. | Explain the economic importance of safflower. | | CO3 | U | 5 |
| 31. | Write the package practices of castor. | | CO3 | U | 5 |
| 32. | What is crop logging? Write the benefits of crop logging. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss cultivable practices of rice fallow cotton. | CO4 | U | 7 |
|  | b. | Differentiate *Corchorus capsularis* and *Corchorus olitorius*. Write its important varieties, seed rate, and spacing of jute. | CO4 | An | 8 |
|  |  |  |  |  |  |
| 34. | a. | Write the Origin, geographic distribution, classification, soil, and climatic requirement for rapeseed and mustard. | CO2 | U | 8 |
|  | b. | Explain the economic importance of rapeseed and mustard. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the methods of planting in sugarcane. | CO5 | U | 8 |
|  | b. | Write the package of practices of SSI. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the geographical distribution, varietal improvements, and adaptability of major oilseed, fiber, and sugar crops cultivated in India. |
| CO2 | Acquire knowledge of crop production technologies for rabi oilseeds. |
| CO3 | Practice on crop production technologies for kharif oilseeds |
| CO4 | Implement crop production technologies for fiber crops. |
| CO5 | Work out crop production technologies for sugar crops. |
| CO6 | Apply the acquired knowledge to guide the farmers in cultivating oilseed, fiber, and sugar crops. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 5 | - | - | - | - | 8 |
| CO2 | 4 | 16 | - | 5 | - | - | 25 |
| CO3 | 6 | 20 | - | - | - | 5 | 31 |
| CO4 | 1 | 7 | - | 8 | - | - | 16 |
| CO5 | 5 | 35 | - | 5 | - | - | 45 |
| CO6 | - | - | - | - | - | - |  |
|  | | | | | | | **125** |



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| --- | --- | --- | --- |
| **Course Code** | **21AG3025** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF GENETICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Study of structural and functional organization of the cell  A) Genetics B) Psychology C) Physiology D) Cytology | | CO1 | U | 1 |
| 2. | Double monosomies is symbolically represented as  A) 2n+1 B) 2n-1-1 C) 2x D) 2x+x | | CO1 | R | 1 |
| 3. | The term chromosome was coined by  A) Strasburger B) Waldeyer C) Balbiani D) Darlington | | CO1 | R | 1 |
| 4. | The theory of epigenesis was proposed by  A) August weismann B) De vries C) Wolff D) Lamark | | CO2 | R | 1 |
| 5. | The supplementary gene interaction has an F2 ratio of  A) 12:3:1 B) 9:3:4 C) 9:6:1 D) 9:7 | | CO2 | R | 1 |
| 6. | An AB blood group individual can accept blood from------------------- individual. | | CO3 | U | 1 |
| 7. | A three-point test cross is possible for genes having ------------------ map distance. | | CO4 | U | 1 |
| 8. | Crossing over takes place during  A) Leptotene B) zygotene C) Pachytene D) Diplotene | | CO1 | U | 1 |
| 9. | In water snails, the coiling pattern of the shell was reported by  A) Correns B) Caspari C) Strutevant D) Ruth sagar | | CO3 | R | 1 |
| 10. | Sex chromosomes are also known as\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 11. | Sex-linked genes are located on  A) X -chromosomes B) Y -chromosomes  C) Autosomes D) All of the above | | CO1 | R | 1 |
| 12. | The term nucleic acid was first used by  A) Miescher B) Altmann C) Mendel D) Watson and crick | | CO2 | R | 1 |
| 13. | The left-handed helical DNA form is  A) A-DNA B) B-DNA C) c-DNA D) Z-DNA | | CO6 | U | 1 |
| 14. | The smallest unit of a gene is\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 15. | A conditional mutant is lethal in a --------------------------------- environment | | CO3 | U | 1 |
| 16. | Define the law of segregation. | | CO1 | R | 1 |
| 17. | Define the mitotic/ meiotic phase. | | CO1 | R | 1 |
| 18. | Define cytoplasmic inheritance. | | CO1 | R | 1 |
| 19. | What are pseudogenes? | | CO2 | R | 1 |
| 20. | Define multiple alleles with examples. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write detailed notes on lampbrush chromosomes. | | CO3 | U | 5 |
| 22. | Describe the various stages of the mitotic/ meiotic phase. | | CO1 | U | 5 |
| 23. | Difference between oligogenic and polygenic traits. | | CO2 | U | 5 |
| 24. | Enumerate the characteristic features of cytoplasmic inheritance. | | CO1 | U | 5 |
| 25. | Write in detail about the types of RNA based on the function. | | CO3 | U | 5 |
| 26. | Differentiate coupling and repulsion phases of linkage. | | CO4 | An | 5 |
| 27. | Write about the causes of change of Hardy – Weinberg equilibrium. | | CO1 | U | 5 |
| 28. | Difference between sex-linked, sex-influenced, and sex limited inheritance. | | CO2 | U | 5 |
| 29. | What is transformation? Give a brief discussion about Griffth experiment. | | CO6 | R | 5 |
| 30. | List out various types of structural chromosomal changes. Describe any one of them in detail. | | CO1 | R | 5 |
| 31. | Differences between prokaryotes and eukaryotes. | | CO1 | U | 5 |
| 32. | What is sex determination in plants? Explain with Melandrium, papaya, and maize | | CO1 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What is Aneuploidy? Describe its types and their role in crop improvement. | CO2 | R | 7.5 |
|  | b. | Explain in detail about Bateson and Punnetts experiment on fowl comb shape. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What is crossing over? Write about the factors affecting crossing over and mention their significance. | CO3 | R | 7.5 |
|  | b. | Write in detail about the chromosomal theory of sex determination with a suitable example. | CO1 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | What is mutation and write its characteristics. Enumerate in detail the types of chemical mutagen and their mode of action with examples. | CO3 | R | 7.5 |
|  | b. | Write about the models and steps involved in DNA replication. | CO5 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the genetic interactions and central dogma of life. |
| CO2 | Analyze the advanced techniques in gene isolation, synthesis, and cloning. |
| CO3 | Explore the tools used in genomics, transcriptomics, proteomics, and epigenetics. |
| CO4 | Differentiate quantitative and qualitative genetics. |
| CO5 | Understand the concept of gene silencing, DNA restriction, and sequencing techniques. |
| CO6 | Recognize the polymorphisms in DNA and proteins. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 17 | 29.5 | - | - | - | - | 46.5 |
| CO2 | 13.5 | 17.5 | - | - | - | - | 31 |
| CO3 | 16 | 12 | - | - | - | - | 28 |
| CO4 | - | 1 | - | 5 | - | - | 6 |
| CO5 | - | 7.5 | - | - | - | - | 7.5 |
| CO6 | 5 | 1 | - | - | - | - | 6 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3026** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF CYTOGENETICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is the duration of the G1 phase? | | CO5 | U | 1 |
| 2. | During mitosis, synapsis occurs in the phase called -----------------------   1. Telophase b) anaphase c) prophase d) none of the above | | CO5 | R | 1 |
| 3. | In mitosis, DNA synthesis takes place in   1. G1 stage b)S stage**, c)** G2 stage, d) all of the above | | CO4 | An | 1 |
| 4. | In mitosis longest phase is ------------------------- | | CO4 | A | 1 |
| 5. | What is Holokinetic? | | CO1 | U | 1 |
| 6. | The term chromosome was coined by ------------------------------- | | CO4 | R | 1 |
| 7. | Double monosomic is symbolically represented as ----------------------   1. 2n+1 b)2n-1-1**, c)** 2x, d) 2x+x | | CO3 | R | 1 |
| 8. | Differentiate karyokinesis and cytokinesis. | | CO1 | AN | 1 |
| 9. | State True or false--In animal cell, cytoplasm divides by the formation of cell plate. | | CO4 | R | 1 |
| 10. | What is meant by Euchromatin region? | | CO1 | U | 1 |
| 11. | Which one of the banding techniques is based on fluorescent dye?   1. Q banding b)G banding**, c)** C banding, d) R banding | | CO1 | R | 1 |
| 12. | What is meant by iso chromosome? | | CO5 | U | 1 |
| 13. | The internal pairing of isochromosomes leads to the formation of ---------------   1. Bivalent ring b)univalent ring**,** c)double ring, d) triple ring | | CO6 | R | 1 |
| 14. | Duplication mainly arises due to ---------------- | | CO2 | R | 1 |
| 15. | Define eugenics. | | CO6 | U | 1 |
| 16. | Give the genome of manmade cereal. | | CO5 | R | 1 |
| 17. | What is meant by alien addition? | | CO3 | U | 1 |
| 18. | The first cross between radish and cabbage was made by ------------- in --------- | | CO2 | AN | 1 |
| 19. | What is meant by synthetic allopolyploids? | | CO2 | R | 1 |
| 20. | What are the main causes of hybrid sterility? | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the prokaryotic chromosome. | | CO5 | U | 5 |
| 22. | Explain the significance of mitosis. | | CO5 | R | 5 |
| 23. | Write short notes on secondary constriction and sat- sat-sat-chromosome. | | CO1 | R | 5 |
| 24. | Explain karyotype and idiotype. | | CO1 | AN | 5 |
| 25. | Describe the ring chromosome. | | CO5 | U | 5 |
| 26. | Give the genetic significance of Deficiencies and Duplication. | | CO3 | R | 5 |
| 27. | What is Aneuploid? Explain the types of Aneuploid. | | CO2 | U | 5 |
| 28. | What is translocation and explain the reciprocal translocation and its types. | | CO3 | R | 5 |
| 29. | Describe the chromosome banding and explain the Q and G banding techniques. | | CO1 | R | 5 |
| 30. | Explain the synaptonemal complex. | | CO6 | U | 5 |
| 31. | Give an application of autopolyploidy in crop improvement. | | CO2 | U | 5 |
| 32. | What are the barriers to wide hybridization? | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List the various stages and sub-stages of meiosis. Describe the different substages of prophase I. Give a suitable diagram. | CO2 | U | 8 |
|  | b. | Discuss the function of meiosis. | CO5 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Define chromosomal aberration. Describe the various structural chromosomal aberrations with the help of suitable diagrams. | CO4 | U | 8 |
|  | b. | Give the effects of Nullisomy and Trisomy in humans. | CO4 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | Briefly describe the role of polyploidy in the evolution of crops – tobacco, cotton, and wheat. | CO2 | R | 8 |
|  | b. | Explain the folded–fiber model of chromosomes with a suitable diagram. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the karyotyping and banding techniques in chromosome |
| CO2 | Know the evolution of crops and the role of polyploidy in crop improvement |
| CO3 | Comprehend the alien addition and substitution lines |
| CO4 | Identify the genetic hindrances in hybridization |
| CO5 | Manipulate the chromosomes for the synthesis of improved crop species |
| CO6 | Generate mapping populations to initiate plant-breeding research |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 11 | 2 |  | 6 |  |  | 19 |
| CO2 | 10 | 18 |  | 1 |  |  | 29 |
| CO3 | 11 | 1 |  |  |  |  | 12 |
| CO4 | 15 | 8 | 1 | 1 |  |  | 25 |
| CO5 | 14 | 19 |  |  |  |  | 33 |
| CO6 | 1 | 6 |  |  |  |  | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3027** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF PLANT BREEDING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is Heritability? | | CO6 | U | 1 |
| 2. | Expand PPV & FR. | | CO4 | R | 1 |
| 3. | Define the Law of homologous series. | | CO1 | A | 1 |
| 4. | Define Plant Breeding. | | CO1 | A | 1 |
| 5. | What is stress? | | CO3 | R | 1 |
| 6. | Write the difference between Synthetic and Composite. | | CO5 | U | 1 |
| 7. | Define Hardy – Weinberg Law. | | CO5 | R | 1 |
| 8. | Define self-pollination. | | CO1 | A | 1 |
| 9. | Define Hybrids. | | CO5 | U | 1 |
| 10. | Define Acclimatization. | | CO3 | R | 1 |
| 11. | What is self-incompatibility? | | CO1 | U | 1 |
| 12. | Define inbreeding. | | CO3 | R | 1 |
| 13. | Explain transgressive breeding. | | CO2 | A | 1 |
| 14. | Define multiline. | | CO4 | R | 1 |
| 15. | What is Participatory Plant breeding? | | CO6 | A | 1 |
| 16. | Define patents. | | CO4 | R | 1 |
| 17. | What is Ideotype? | | CO2 | U | 1 |
| 18. | Write Johannsen’s pure line theory. | | CO1 | R | 1 |
| 19. | What is mutation? | | CO2 | U | 1 |
| 20. | Expand PCR and DNA. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the objectives of the Plant Breeding. | | CO1 | U | 5 |
| 22. | Discuss the components of genetic recourse. | | CO4 | A | 5 |
| 23. | Explain the Vertical and horizontal resistance. | | CO3 | U | 5 |
| 24. | Explain the mechanism promoting cross-pollination. | | CO6 | U | 5 |
| 25. | Discuss the Modified ear-to-row method in maize. | | CO6 | A | 5 |
| 26. | What is Heterosis? Explain the types of Heterosis. | | CO4 | R | 5 |
| 27. | What is pedigree? Describe the procedure of pedigree selection. | | CO2 | R | 5 |
| 28. | Explain the systems of Matting. | | CO2 | U | 5 |
| 29. | Write briefly about the planning the Procedure of Hybridization. | | CO5 | U | 5 |
| 30. | Define male sterility. Briefly describe the Classification of male sterility. | | CO6 | R | 5 |
| 31. | Discuss the methods of breeding for disease resistance. | | CO3 | A | 5 |
| 32. | What are the merits and demerits of the Bulk method? | | CO1 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss in detail the centers of origin. | CO1 | A | 7.5 |
|  | b. | Differentiate between pure line and mass selection. | CO6 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What is the clone? Describe the procedure of clonal selection. Discuss briefly the practical achievement of clonal selection | CO2 | R | 7.5 |
|  | b. | Explain the steps involved in the backcross breeding procedure for the transfer of the dominant trait. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | What is mutation? Describe the procedure of mutation breeding. | CO2 | R | 7.5 |
|  | b. | Briefly describe various steps involved in the release of a new variety. | CO4 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Ascertain the breeding methods of self, cross, and often cross-pollinated crops |
| CO2 | Understand the influence of transgressive and mutation breeding |
| CO3 | Explore the fundamentals of stress breeding |
| CO4 | Apprehend the essentials of maintenance breeding and varietal release procedures |
| CO5 | Identify the appropriate tools for hybridization Programs |
| CO6 | Select the best combiners for varietal and hybrid breeding |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 6 | 10.5 | - | - | - | 22.5 |
| CO2 | 21 | 7 | 1 | - | - | - | 29 |
| CO3 | 8 | 7.5 | 5 | - | - | - | 20.5 |
| CO4 | 8 | - | 5 | - | - | - | 13 |
| CO5 | 1 | 14.5 | - | - | - | - | 15.5 |
| CO6 | 5 | 13.5 | 6 | - | - | - | 24.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3028** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF QUANTITATIVE GENETICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is a cluster diagram? | | CO1 | U | 1 |
| 2. | Concept of path coefficient analysis was originally developed by ---------------   1. Sewall Wright b) K.Mather c) R.A.Fisher d) Smith | | CO1 | R | 1 |
| 3. | Define residual effect. | | CO2 | U | 1 |
| 4. | Simple correlation is also known as -------------------------- | | CO3 | U | 1 |
| 5. | A square of multiple correlations is called ---------------------- | | CO3 | R | 1 |
| 6. | State True or False - Phenotypic path is estimated from all possible phenotypic correlations among various characters | | CO3 | U | 1 |
| 7. | Progeny of the matting of two individuals is -------------------------- | | CO4 | R | 1 |
| 8. | A diallel with F1 and reciprocals is referred to as **--------------------------** | | CO4 | U | 1 |
| 9. | State true or false -- Diallel cross fails to provide information about epistatic variance. | | CO4 | R | 1 |
| 10. | The significance of D scales reveals -------------------------- types of epistasis. | | CO2 | R | 1 |
| 11. | Define specific genotype adoption. | | CO6 | AN | 1 |
| 12. | What is meant by homeostasis? | | CO1 | R | 1 |
| 13. | What is meant by selection differential? | | CO1 | U | 1 |
| 14. | Breeding value is related to ----------------------------------   1. Additive variance b) dominance variance c) Epistatic variance d) all the above | | CO2 | R | 1 |
| 15. | State true or false -- A genetically superior individual is not necessarily a genetically superior parent. | | CO1 | R | 1 |
| 16. | Parameters used in Eberhart & Russell model are ----------------------------- | | CO6 | U | 1 |
| 17. | Partial correlation is represented as -------------------------- | | CO4 | U | 1 |
| 18. | The number of all possible double-crosses among n parents is equal to --------- | | CO3 | A | 1 |
| 19. | NCD 1 is also known as --------------------------- | | CO5 | U | 1 |
| 20. | A graph which is constructed in Hayman’s approach of diallel analysis is ---------------------- | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Compare correlation and regression analysis. | | CO1 | AN | 5 |
| 22. | Explain the features of polygenic traits. | | CO1 | U | 5 |
| 23. | Explain briefly the procedure of studying variability through metroglyph analysis. | | CO3 | U | 5 |
| 24. | Describe the types of heritability. | | CO2 | U | 5 |
| 25. | What are the limitations of PCA? | | CO2 | AN | 5 |
| 26. | Write short notes on genotypic correlation. | | CO3 | U | 5 |
| 27. | Explain the types of path coefficient analysis. | | CO4 | U | 5 |
| 28. | Differentiate full diallel and half diallel. | | CO4 | AN | 5 |
| 29. | What is shuttle breeding and give it advantages. | | CO6 | U | 5 |
| 30. | What are the factors affecting adaptability? | | CO6 | U | 5 |
| 31. | Explain the Perkins and Jinks model. | | CO6 | U | 5 |
| 32. | What are the factors influencing heritability? | | CO5 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | What are the factors affecting gene action? | CO4 | U | 8 |
|  | b. | Explain additive variance and its main features. | CO2 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Give a comparison of NCD I and NCD II of biparental cross. | CO3 | AN | 8 |
|  | b. | What are six parameter models? Give its merits and demerits. | CO3 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | What is marker-assisted selection and describe the steps in MAS? | CO5 | U | 8 |
|  | b. | Differentiate between qualitative and quantitative traits. | CO1 | AN | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Decide suitable breeding procedures for trait-specific breeding programs |
| CO2 | Understand the gene actions and selection indices for identifying suitable parents |
| CO3 | Compute the designs of experiments and analyses involved in breeding programs |
| CO4 | Interpret the results of mating designs and their implications in plant breeding |
| CO5 | Generate mapping populations for QTL analysis. |
| CO6 | Understand the effect of G x E interactions and stability models in crop improvement |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 4 | 7 |  | 12 |  |  | 23 |
| CO2 | 2 | 13 |  | 5 |  |  | 20 |
| CO3 | 8 | 12 | 1 | 8 |  |  | 29 |
| CO4 | 2 | 15 |  | 5 |  |  | 22 |
| CO5 | 5 | 9 |  |  |  |  | 14 |
| CO6 |  | 16 |  | 1 |  |  | 17 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3214** | **Duration** | **3hrs** |
| **Course Name** | **PLANT BIOCHEMISTRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Vitamins. | | CO1 | U | 1 |
| 2. | What are Immobilized Enzymes? | | CO2 | R | 1 |
| 3. | What are Reducing Sugars? | | CO1 | U | 1 |
| 4. | What do you mean by Ligase? | | CO3 | A | 1 |
| 5. | How are alkaloids classified? | | CO2 | R | 1 |
| 6. | Differentiate Fat and Oil. | | CO2 | R | 1 |
| 7. | What is HMP pathway? | | CO4 | U | 1 |
| 8. | What are Zwitter ions? | | CO3 | R | 1 |
| 9. | What do you mean by fibrous proteins? | | CO3 | A | 1 |
| 10. | What is Purines? | | CO1 | U | 1 |
| 11. | What is an active site? | | CO5 | U | 1 |
| 12. | What are Apoenzymes? | | CO4 | R | 1 |
| 13. | What is the significance of the HMP pathway? | | CO6 | U | 1 |
| 14. | What are Polysaccharides? | | CO5 | U | 1 |
| 15. | What is Glycolysis? | | CO4 | R | 1 |
| 16. | Which reagent is used for the quantitative determination of proteins? | | CO5 | R | 1 |
| 17. | What is RNA? | | CO6 | R | 1 |
| 18. | Give an example of a glycerophospholipid. | | CO6 | U | 1 |
| 19. | What are secondary metabolites? | | CO1 | R | 1 |
| 20. | What is TCA cycle? | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on Biological Macromolecules. | | CO5 | A | 5 |
| 22. | Write short notes on Sucrose. | | CO4 | R | 5 |
| 23. | Write short notes on Essential Amino acids. | | CO6 | R | 5 |
| 24. | Enumerate the structure and functions of Phospholipids. | | CO4 | R | 5 |
| 25. | Discuss the rate-limiting steps of Glycolysis. | | CO3 | U | 5 |
| 26. | Write a note on Biodiesel. | | CO4 | U | 5 |
| 27. | Write short notes on Nitrogenous bases found in Nucleic acids. | | CO3 | A | 5 |
| 28. | Write a note on the structure and functions of amino acids. | | CO4 | R | 5 |
| 29. | Discuss the important features of a plant cell. | | CO4 | U | 5 |
| 30. | Enumerate the factors affecting the enzyme activity. | | CO3 | A | 5 |
| 31. | Write a note on Hormone action. | | CO2 | A | 5 |
| 32. | Write short notes on the Ninhydrin test. | | CO3 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define Polysaccharides and describe the differences between starch and cellulose. | CO2 | R | 7.5 |
|  | b. | Explain Oligosaccharides and enumerate the chemical structure of monosaccharides. | CO1 | R | 7.5 |
| 34. | a. | What are Proteins? Present a classification of Proteins with one example of each class of proteins and write their functions. | CO2 | U | 7.5 |
|  | b. | What is meant by standard amino acids? Classify the standard amino acids and draw the chemical structure of one amino acid for each class. | CO2 | U | 7.5 |
| 35. | a. | Write the definition of fatty acids and classify them. Highlight the differences between the saturated and unsaturated fatty acids giving one example for each. | CO4 | U | 7.5 |
|  | b. | Define Vitamins and give an account of the water-soluble vitamins. | CO5 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** | | | | | | | |
| CO1 | Understand the biochemistry of plant photosynthesis | | | | | | | |
| CO2 | Remember the biosynthesis of plant biomolecules | | | | | | | |
| CO3 | Understand the biochemistry of plant developmental processes | | | | | | | |
| CO4 | Explain the biochemistry of stress mechanisms in plant system | | | | | | | |
| CO5 | Describe the synthesis of secondary metabolites in plant system | | | | | | | |
| CO6 | Discuss defense mechanisms in plant system | | | | | | | |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | | |
| **CO / P** | | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | | 8.5 | 4 | - | - | - | - | 12.5 |
| CO2 | | 10.5 | 20 | 5 | - | - | - | 35.5 |
| CO3 | | 1 | 10 | 12 | - | - | - | 23 |
| CO4 | | 12 | 18.5 | - | - | - | - | 30.5 |
| CO5 | | 1 | 2 | 12.5 | - | - | - | 15.5 |
| CO6 | | 6 | 2 | - | - | - | - | 8 |
|  | | | | | | | | **125** |



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| **Course Code** | **21AG3215** | **Duration** | **3hrs** |
| **Course Name** | **PRINCIPLES OF PLANT PHYSIOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define water potential. | | CO2 | R | 1 |
| 2. | Define hidden hunger. | | CO2 | R | 1 |
| 3. | Cell wall is \_\_\_\_\_\_\_\_\_\_\_ in nature.  A. Elastic B. Impermeable C. Non-living D. Living | | CO1 | R | 1 |
| 4. | The entry of CO2 into stomata is an example of  A. Osmosis B. Imbibition C. Diffusion D. All the above | | CO3 | R | 1 |
| 5. | The element responsible for stomatal opening is  A. Sodium B. Potassium C. Zinc D. Calcium | | CO3 | R | 1 |
| 6. | Differentiate active and passive absorption of water. | | CO2 | An | 1 |
| 7. | Define the Ascent of sap and name two theories associated with it. | | CO2 | R | 1 |
| 8. | The loss of water from the plant in the form of liquid is called as  A. Transpiration B. Vaporization C. Evapotranspiration D. Guttation | | CO2 | R | 1 |
| 9. | What is Seed viability? | | CO4 | R | 1 |
| 10. | Example for CAM Plant.  A. Sugarcane B. Amaranthus C. Rice D. Pineapple | | CO4 | R | 1 |
| 11. | The most abundant protein in the world is  A. RuBisCO B. PEP carboxylase C. Chlorophyllase D. Both A&B | | CO3 | R | 1 |
| 12. | What is Photophosphorylation? | | CO5 | R | 1 |
| 13. | The hormone responsible for stomatal closure is  A. Auxin B. RUBP & CO2 C. Cytokinins D.RUBP & O2 | | CO3 | R | 1 |
| 14. | Whiptail of cauliflower is due to the deficiency of \_\_\_\_\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| 15. | An example of flood-tolerant crops is  A. Rice B. Maize C. Soybean D. Chillies | | CO4 | R | 1 |
| 16. | Define Phloem loading. | | CO2 | R | 1 |
| 17. | Site of photorespiration  A. Glogibodies B. Peroxisome C. Glyoxisomes D. Chromoplast | | CO5 | R | 1 |
| 18. | The substrates for photorespiration are  A. PEP & CO2  B. GA C. PEP & O2 D.ABA | | CO5 | R | 1 |
| 19. | What is meant by greenhouse gases? | | CO4 | R | 1 |
| 20. | Expansion of CGR\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate Transpiration and Guttation. | | CO3 | U | 5 |
| 22. | What are all the advantages of antitranspirants? | | CO3 | R | 5 |
| 23. | Explain the importance of water to plants. | | CO2 | U | 5 |
| 24. | Describe beneficial elements. Give their role in plants. | | CO2 | U | 5 |
| 25. | Discuss the advantages of foliar nutrition. | | CO2 | U | 5 |
| 26. | Summarize the significance of photorespiration. | | CO5 | U | 5 |
| 27. | Explain vernalisation. Write the mechanisms of vernalization. | | CO6 | U | 5 |
| 28. | Criteria of essentiality of elements. | | CO2 | E | 5 |
| 29. | Discuss physiological changes during ripening. | | CO6 | U | 5 |
| 30. | Explain about the growth retardants. | | CO4 | U | 5 |
| 31. | Explain about the apical dominance of auxin. | | CO4 | U | 5 |
| 32. | What are compatible osmolytes? Give examples. | | CO3 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the theory of stomatal opening and closing and list out types of antitranspirants with examples. | CO3 | U | 7.5 |
|  | b. | Summarize the functions of nitrogen and potassium in plants. Explain about their deficiency symptoms. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | In what way C4 plants are more efficient than C3 plants? Explain in detail. | CO3 | R | 7.5 |
|  | b. | What are the methods of nutrient application? | CO2 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Extend the physiological roles of auxin, cytokinin, and ethylene in plants. | CO4 | U | 7.5 |
|  | b. | Explain the mechanisms of drought and salinity resistance in crop plants. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain about the physiological functions of cell organelles. |
| CO2 | Discuss the relationship between soil, water, and plants. |
| CO3 | Explain about the stomatal function, transpiration, and water stress in plants. |
| CO4 | Describe the role of various growth regulators on plant growth. |
| CO5 | Describe photosynthesis and photorespiration. |
| CO6 | Explain about the physiology of flowering and plant movements. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | - | - | - | - | - | 1 |
| CO2 | 12.5 | 22.5 | - | 1 | 5 | - | 41 |
| CO3 | 21.5 | 20 | - | - | - | - | 41.5 |
| CO4 | 6 | 17.5 | - | - | - | - | 23.5 |
| CO5 | 3 | 5 | - | - | - | - | 8 |
| CO6 | - | 10 | - | - | - | - | 10 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3216** | **Duration** | **3hrs** |
| **Course Name** | **SOIL FERTILITY AND FERTILIZER USE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Elements stimulate plant growth but are not essential elements are  a) Primary macronutrients b) Secondary macronutrients  c) Micronutrients d) Beneficial elements | | CO1 | R | 1 |
| 2. | Availability of most of the nutrients will be higher in  a) Acidic b) Alkaline c) Basic d) Neutral | | CO1 | U | 1 |
| 3. | Zinc deficiency in rice is known as  a) Akiochi b) Little leaf c) Khaira d) White bud | | CO2 | An | 1 |
| 4. | Which is the Ultra micronutrient?  a) B b) Mo c) Zn d) Fe | | CO2 | A | 1 |
| 5. | By product of sugarcane industry used as manure is  a) Flyash b) Pressmud c) Biogass slurry d) Coirpith | | CO3 | U | 1 |
| 6. | Single super phosphate contains \_\_\_\_\_\_ % of P2O5  a) 22 b) 46 c) 10 d) 16 | | CO3 | R | 1 |
| 7. | Application of fertilizer through irrigation is called  a) Herbigation b) Immobilization c) Fertigation d) Mineralization | | CO4 | A | 1 |
| 8. | Law of minimum was  a) Spillman b) Von Liebig c) Mitscherlitch d) Thomas way | | CO4 | R | 1 |
| 9. | Fertilizer use effieicency will be higher in  a) Placement b) Fertigation c) Broadcasting d) Band application | | CO5 | U | 1 |
| 10. | Urease inhibitors reduces the \_\_\_\_\_\_\_\_ of urea  a) Hydrolysis b) Voltalization c) Aminization d) Leaching | | CO5 | An | 1 |
| 11. | Crop logging was used in the production of \_\_\_\_\_\_\_\_ crop in Hawai, USA  a) Rice b) Sugarcane c) Maize d) Cotton | | CO6 | R | 1 |
| 12. | The principle aim of \_\_\_\_ is to utilize all the sources of plant nutrients in a judicious & efficient manner  a) Organic farming b) IPNS c) SSNM d) Inorganic fertilizer application | | CO6 | U | 1 |
| 13. | Define luxury consumptions. | | CO1 | A | 1 |
| 14. | What is mean soil productivity? | | CO1 | U | 1 |
| 15. | List the immobile nutrient in plant. | | CO2 | R | 1 |
| 16. | Name any two K fertilizer with its composition. | | CO3 | A | 1 |
| 17. | Define green manure with example. | | CO3 | U | 1 |
| 18. | What is slow release fertilizer and its example? | | CO5 | A | 1 |
| 19. | What is LCC? | | CO6 | E | 1 |
| 20. | List the 4R’s in nutrient management concepts. | | CO6 | E | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write arnons and stout criteria of essentiality of nutrients with example. | | CO1 | U | 5 |
| 22. | Classify nutrients based on composition or relative abundance by plants. | | CO1 | E | 5 |
| 23. | List the functions and deficiency symptoms of N&P in plant. | | CO2 | A | 5 |
| 24. | Major forms of nutrient elements absorbed by plants. | | CO2 | An | 5 |
| 25. | Differentiate Manure’s and Fertilizers. | | CO3 | U | 5 |
| 26. | What is chelated micronutrient fertilizers? Give example of organic & inorganic chelates. | | CO3 | A | 5 |
| 27. | Write Source forms and transformation of Sulphur in soil. | | CO3 | E | 5 |
| 28. | Explain in detail about various methods of fertilizer application. | | CO4 | U | 5 |
| 29. | Explain Liebig and Mitscherlich concept of soil fertility evaluation. | | CO4 | An | 5 |
| 30. | Classify organic manure with example. | | CO3 | An | 5 |
| 31. | Explain in detail about any two soil fertility evaluation techniques methods. | | CO6 | A | 5 |
| 32. | Explain in detail about site specific nutrient management concepts. | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write the classification of Nitrogenous fertilizer with example. | CO2 | U | 7.5 |
|  | b. | Write the behavior of Nitrogen fertilizer in soil with equations. | CO2 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What are the objective & methods of soil testing? | CO4 | A | 5 |
|  | b. | Explain the biological methods of soil fertility evaluation. | CO4 | An | 10 |
|  |  |  |  |  |  |
| 35. | a. | What is fertilizer use efficiency and list nutrient wise? | CO5 | An | 5 |
|  | b. | Explain methods involved in P & K use efficiency with suitable example | CO5 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Discuss on the basic concepts of soil fertility and productivity |
| CO2 | Describe the essential plant nutrients |
| CO3 | Discuss on the major fertilizer sources and its management |
| CO4 | Outline on the common soil test methods for fertilizer recommendations |
| CO5 | Overview on the fertilizer use efficiency |
| CO6 | Outline on the fertilizer recommendations and its various approaches |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 1 | 7 |  |  | 5 |  | 13 |
| CO2 | 1 | 7.5 | 6 | 13.5 |  |  | 28 |
| CO3 | 1 | 7 | 6 | 5 | 5 |  | 24 |
| CO4 | 1 | 5 | 6 | 15 |  |  | 27 |
| CO5 | 1 | 1 | 11 | 6 |  |  | 19 |
| CO6 | 1 | 1 | 5 | 5 | 2 |  | 14 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3217** | **Duration** | **3hrs** |
| **Course Name** | **EXPERIMENTAL DESIGNS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What is ANOVA? | | CO1 | R | 1 |
| 2. | What are the basic principles of experimental design? | | CO1 | R | 1 |
| 3. | Define experimental unit. | | CO1 | U | 1 |
| 4. | What is treatment? | | CO1 | R | 1 |
| 5. | Define Uniformity trial. | | CO1 | R | 1 |
| 6. | Define partial confounding | | CO1 | R | 1 |
| 7. | What is incomplete block design? | | CO2 | R | 1 |
| 8. | Give the ANOVA model of CRD with ‘5’ varieties. | | CO2 | An | 1 |
| 9. | Mention the steps of obtaining various sums of squares in RBD design with r = 4 and t = 5. | | CO3 | An | 1 |
| 10. | Is unequal replication possible in CRD? | | CO3 | An | 1 |
| 11. | Differentiate symmetrical and asymmetrical factorial experiment. | | CO3 | U | 1 |
| 12. | Define factor and level. | | CO3 | R | 1 |
| 13. | Define interaction effect. | | CO3 | R | 1 |
| 14. | List the Merits and demerits of LSD. | | CO4 | A | 1 |
| 15. | Give two latin squres. | | CO4 | R | 1 |
| 16. | When is Yate’s method adopted? | | CO5 | A | 1 |
| 17. | Write the ANOVA model of FCRD for three factors A, B and C each at 2 levels. | | CO5 | An | 1 |
| 18. | Write the ANOVA model of FRBD for three factors A, B and C each at 3 levels. | | CO5 | An | 1 |
| 19. | What is Lattice design? | | CO6 | U | 1 |
| 20. | What is Alpha design? | | CO6 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe two way ANOVA and give assumptions. | | CO1 | An | 5 |
| 22. | Delineate post hoc tests | | CO2 | E | 5 |
| 23. | Explain maximum curvature method. | | CO3 | E | 5 |
| 24. | Write the interpretation of the following bar chart | | CO4 | An | 5 |
| 25. | Interpret the following  yield groups  T3 7.01 a  T1 5.75 b  T2 4.84 b | | CO4 | An | 5 |
| 26. | Describe extraneous factors. | | CO1 | U | 5 |
| 27. | Explain the detailed layout and analysis of asymmetrical 3x2 factorial design. | | CO5 | An | 5 |
| 28. | Furnish the ANOVA table of 32 factorial experiment and how will you conduct analysis? | | CO3 | An | 5 |
| 29. | When will you conduct analysis of covariance? | | CO3 | An | 5 |
| 30. | When will you choose split plot design? Explain. | | CO5 | An | 5 |
| 31. | Write the applications of strip plot design and give its merits and demerits. | | CO5 | A | 5 |
| 32. | Explain resolvable designs. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | The following table gives the yields (in kg) of four plots each of three varieties of wheat. Find out if the varieties are significantly different among themselves.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Varieties | Plots yield | | | | | 1 | 24 | 25 | 24 | 28 | | 2 | 20 | 18 | 21 | 22 | | 3 | 22 | 20 | 19 | 23 | | 4 | 25 | 28 | 29 | - | | 5 | 15 | 17 | 13 | - | | CO2 | An | 15 |
|  | b. | What is data transformation? Explain log and square root transformations. | CO1 | A |
|  |  |  |  |  |  |
| 34. | a. | How will you carry out missing plot technique in RBD? | CO3 | An | 15 |
|  | b. | Explain the detailed layout and analysis of 23 factorial design. | CO4 | An |
|  |  |  |  |  |  |
| 35. | a. | Write the analysis procedure of BIBD. | CO5 | An | 15 |
|  | b. | Explain the applications of Response surface designs. | CO6 | A |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | COURSE OUTCOMES |
| CO1 | Summarize the concepts of the design of experiments. |
| CO2 | Explain the principles of experimental designs |
| CO3 | Analyse and select optimum experimental designs for their field research |
| CO4 | Apply the principles of design while framing the field layouts |
| CO5 | Remember the applications of experimental designs |
| CO6 | Analyze the resolvable designs |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
|  | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** |  |
| CO1 | 5 | 6 | 7 | 5 | - | - | 23 |
| CO2 | 1 | - | - | 9 | 5 | - | 19 |
| CO3 | 2 | 1 | - | 20 | 5 | - | 28 |
| CO4 | 1 | - | 1 | 17 | - | - | 9 |
| CO5 | - | - | 6 | 20 | - | - | 26 |
| CO6 | - | 7 | 7 | - | - | - | 14 |
|  | | | | | | | **125** |



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| **Course Code** | **21AG3224** | **Duration** | **3hrs** |
| **Course Name** | **INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Show the characteristics of copyright. | | CO1 | U | 1 |
| 2. | What is Trademark Act? | | CO1 | R | 1 |
| 3. | List the benefits of patent. | | CO2 | R | 1 |
| 4. | What is GATT? | | CO2 | R | 1 |
| 5. | State PPV & FR act 2001. | | CO2 | R | 1 |
| 6. | Define trade secret and how is it protected? | | CO1 | U | 1 |
| 7. | What is Budapest treaty? | | CO1 | R | 1 |
| 8. | Write about Indian patent act 1970. | | CO2 | R | 1 |
| 9. | Define: Material Transfer Agreement. | | CO6 | U | 1 |
| 10. | Write a short note on patent search. | | CO2 | R | 1 |
| 11. | Write short notes on E-Contract. | | CO3 | R | 1 |
| 12. | What is Patent Amendment Act? | | CO5 | U | 1 |
| 13. | List the features of Paris Convention. | | CO4 | A | 1 |
| 14. | List the provisions of the TRIPS Agreement. | | CO4 | U | 1 |
| 15. | Write about Institute Technology Management Unit (ITMU). | | CO2 | U | 1 |
| 16. | Write a short note on WTO Treaties. | | CO4 | R | 1 |
| 17. | Define patentability and what can be patented? | | CO2 | U | 1 |
| 18. | Define Innovation. | | CO2 | R | 1 |
| 19. | List the four items of India that are granted with ‘Geographical indications’ tag. | | CO5 | R | 1 |
| 20. | What is the rule for the transfer of copyright? | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on Madrid agreement. | | CO1 | U | 5 |
| 22. | What are the steps in the patent application process? | | CO1 | R | 5 |
| 23. | Explain the actual and relative grounds for refusal for registration of the trade mark. | | CO2 | R | 5 |
| 24. | Explain the difference between Geographical indication and Trade mark. | | CO2 | A | 5 |
| 25. | Describe the protection against unfair competition. | | CO1 | U | 5 |
| 26. | Write a short note on journey of the Indian patent system. | | CO4 | A | 5 |
| 27. | Briefly explain compulsory licensing along with its terms and conditions. | | CO2 | A | 5 |
| 28. | Briefly explain the registration process of PPV & FR act 2001. | | CO5 | U | 5 |
| 29. | Write short notes on right of traditional knowledge (TK) holders. | | CO5 | R | 5 |
| 30. | Differentiate the process and product innovation. | | CO3 | R | 5 |
| 31. | What is not Patentable? (or) Bring Out the inventions not patentable as laid down in the Indian Patent Act, 1970. | | CO1 | U | 5 |
| 32. | Explain the Enforcement of IPRs in INDIA. | | CO4 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the procedure to be followed for registration of geographical indication. | CO1 | R | 7.5 |
|  | b. | What is a patent? What are the basics of patent? What is the implication of patent in agriculture? | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What is International Treaty on Plant Genetic Resource for Food and Agriculture (ITPGRFA)? | CO5 | R | 7.5 |
|  | b. | What is 'Copy Right'? Why Copy Right is needed? What is Licence Agreement? | CO5 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | “Unfair practices of business generally occur due to the mal practices of patent and IPR”. Discuss with suitable examples. | CO4 | U | 7.5 |
|  | b. | Write a note on "Research Collaboration Agreement”. | CO5 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand GATT, WTO, TRIPs and WIPO for IPR protection |
| CO2 | Know to acquire the patent and copyright for their innovative work |
| CO3 | Remember plagiarism, which can be questioned legally |
| CO4 | Explain UPOV, PPV, and FR Act of India |
| CO5 | Apply, Analyze and use ITK strategies |
| CO6 | Achieve new innovative goals |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 14.5 | 17 | - | - | - | - | 31.5 |
| CO2 | 11 | 9.5 | 10 | - | - | - | 30.5 |
| CO3 | 6 | - | - | - | - | - | 6 |
| CO4 | 1 | 13.5 | 6 | - | - | - | 20.5 |
| CO5 | 13.5 | 6 | 15 | - | - | - | 34.5 |
| CO6 | 1 | 1 | - | - | - |  | 2 |
|  | | | | | | | **125** |



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| **Course Code** | **21HO1251** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF HORTICULTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Horticulture. | | CO1 | U | 1 |
| 2. | Write any two national institutes involved in the Research of Horticulture. | | CO1 | U | 1 |
| 3. | Define kitchen garden. | | CO1 | U | 1 |
| 4. | What is a mist chamber? | | CO4 | U | 1 |
| 5. | What is propagation? | | CO4 | U | 1 |
| 6. | Define plant growth regulators. | | CO4 | U | 1 |
| 7. | Define orchard. | | CO5 | U | 1 |
| 8. | What is soil fertility? | | CO2 | U | 1 |
| 9. | Differentiate training and pruning. | | CO4 | U | 1 |
| 10. | Define micropropagation | | CO4 | U | 1 |
| 11. | Define top working. | | CO5 | U | 1 |
| 12. | What is the quincunx system of planting? | | CO5 | U | 1 |
| 13. | What is Horticulture maturity? | | CO1 | U | 1 |
| 14. | Define fruitfulness. | | CO2 | R | 1 |
| 15. | What do you mean by stock and scion? | | CO4 | U | 1 |
| 16. | What is drip irrigation? | | CO4 | R | 1 |
| 17. | What is coir compost? | | CO1 | U | 1 |
| 18. | Define Apomixis | | CO2 | R | 1 |
| 19. | Compare organic and inorganic Fertilizers. | | CO2 | AN | 1 |
| 20. | Define Arboriculture. | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out different types of Pruning. | | CO5 | R | 5 |
| 22. | What are the agroclimatic zones of India? | | CO1 | U | 5 |
| 23. | Discuss the use of Plant growth regulators in Horticulture crops. | | CO4 | U | 5 |
| 24. | Explain on Merits and demerits of sexual propagation. | | CO4 | U | 5 |
| 25. | Write short notes on Air layering. | | CO4 | U | 5 |
| 26. | Differentiate sucker and Bulb. | | CO4 | U | 5 |
| 27. | What are the principles for planning of a Nutritional garden? | | CO2 | R | 5 |
| 28. | What are the different stages of Micropropagation? | | CO4 | U | 5 |
| 29. | List out the causes for fruit drop. | | CO2 | R | 5 |
| 30. | Explain on Multistorey cropping system. | | CO4 | U | 5 |
| 31. | Write short notes on Propagation through specialized plant parts. | | CO4 | R | 5 |
| 32. | Describe the aim of organic farming in Horticulture crops. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain in detail the nutritive value of Horticulture crops. | CO1 | U | 7.5 |
|  | b. | What is High-density planting? Give its advantages and disadvantages. | CO2 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss different types of grafting with examples. | CO4 | R | 7.5 |
|  | b. | Explain the different Layering Methods with examples. | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the orchard and its management. | CO5 | U | 7.5 |
|  | b. | Discuss different bearing habits of Horticulture crops. | CO6 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Explain the significance and scope of horticultural crops |
| CO2 | Identify and describe the growth and development of various horticultural crops |
| CO3 | Discuss the production of horticultural crops in the country and related imports and exports |
| CO4 | Demonstrate the production techniques of horticultural crops |
| CO5 | Plan the establishment of Orchard and its management |
| CO6 | Practice Special horticultural operations and organic farming in these crops |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 17.5 |  |  |  |  | 17.5 |
| CO2 | 19.5 | 2 |  | 1 |  |  | 21.5 |
| CO3 |  |  |  |  |  |  |  |
| CO4 | 21 | 36 |  |  |  |  | 57 |
| CO5 |  | 15.5 |  |  |  |  | 15.5 |
| CO6 | 12.5 |  |  |  |  |  | 12.5 |
|  | | | | | | | **125** |



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| **Course Code** | **21HO1251** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF HORTICULTURE** | **Max. Marks** | **100** |

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| **Q.**  **No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name 2 fruit crops rich in Vitamin A content. | | CO1 | R | 1 |
| 2. | Provide 2 examples of arid zone fruit crops cultivated in India. | | CO1 | R | 1 |
| 3. | Provide 2 examples of Plantation crops cultivated in south India. | | CO1 | R | 1 |
| 4. | Mention 2 plantation crops commercially propagated through seeds. | | CO3 | R | 1 |
| 5. | Provide 2 example of horticultural crops which can be propagated through tubers. | | CO3 | U | 1 |
| 6. | Mention the two components of grafting. | | CO3 | U | 1 |
| 7. | Name two horticultural crops which are propagated through herbaceous cuttings. | | CO3 | U | 1 |
| 8. | Name two horticultural crops that are propagated through root suckers. | | CO3 | R | 1 |
| 9. | Write two examples for cut flowers. | | CO1 | U | 1 |
| 10. | Name 2 growth regulators used for promoting rooting of cuttings. | | CO5 | R | 1 |
| 11. | Expand IIHR and provide its HQ. | | CO1 | R | 1 |
| 12. | Name two fruit crops in which air layering is commercially practiced for propagation. | | CO3 | R | 1 |
| 13. | Mention two methods of grafting used for rejuvenation of fruit crops/orchards. | | CO3 | R | 1 |
| 14. | Write the mode of propagation in a) banana b) strawberry. | | CO3 | U | 1 |
| 15. | Name two factors affecting dormancy of seeds. | | CO3 | R | 1 |
| 16. | What are short day crops? | | CO1 | U | 1 |
| 17. | Provide 2 examples of fruit crops in which inter-generic root stocks are selected for grafting. | | CO3 | R | 1 |
| 18. | Mention 2 dwarfing rootstocks employed in mango. | | CO3 | R | 1 |
| 19. | Define totipotency. | | CO3 | U | 1 |
| 20. | Mention two basal medias used in tissue culture. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Briefly describe the contributions of horticulture to national economy. | | CO1 | R | 5 |
| 22. | Explain the different methods of application of growth regulators for rooting of cuttings | | CO3 | U | 5 |
| 23. | What are the advantages and disadvantages of vegetative propagation? | | CO3 | E | 5 |
| 24. | Explain the method of air layering with illustrations and examples. | | CO3 | E | 5 |
| 25. | Explain the method of T budding and patch budding in horticultural crops with illustrations and examples. | | CO3 | R | 5 |
| 26. | What are the advantages and disadvantages of micropropagation. | | CO3 | R | 5 |
| 27. | Explain the structure, facilities and functioning of a mist propagation unit. | | CO3 | E | 5 |
| 28. | Explain the concept of market garden, truck garden and floating garden. | | CO1 | R | 5 |
| 29. | Explain the guidelines for planning and layout of an orchard. | | CO4 | U | 5 |
| 30. | Explain the technique of high density planting with examples of crops. | | CO4 | R | 5 |
| 31. | What are the different bearing habits in fruit crops? Explain each of them with examples. | | CO4 | R | 5 |
| 32. | Briefly describe the applications of growth regulators in horticulture. | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List and explain the different methods of budding with illustrations. | CO3 | R | 7.5 |
|  | b. | Explain the various propagation and plant growing structures used in Horticulture. | CO3 | E | 7.5 |
| 34. | a. | Explain the various cropping systems adopted in horticulture. | CO4 | E | 7.5 |
|  | b. | Explain the various factors affecting fruit set in horticultural crops. | CO2 | R | 7.5 |
| 35. | a. | Explain the various methods and treatments for breaking seed dormancy. | CO3 | U | 7.5 |
|  | b. | What is a kitchen garden/nutrition garden? Explain the concept, design and layout guidelines, components and benefits of nutrition garden. | CO1 | R | 7.5 |

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the significance and scope of horticultural crops |
| CO2 | Identify and describe the growth and development of various horticultural crops |
| CO3 | Discuss the production of horticultural crops in the country and related imports and exports |
| CO4 | Demonstrate the production techniques of horticultural crops |
| CO5 | Plan the establishment of Orchard and its management |
| CO6 | Practice Special horticultural operations and organic farming in these crops |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / P | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 21.5 | 2 | - | - | - | - | 23.5 |
| CO2 | 7.5 | - | - | - | - | - | 7.5 |
| CO3 | 25.5 | 17.5 | - | - | 22.5 | - | 65.5 |
| CO4 | 15 | 5 | - | - | 7.5 | - | 27.5 |
| CO5 | 1 | - | - | - | - | - | 1 |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |

**Graphical user interface, application

Description automatically generated with medium confidence**

**END SEMESTER EXAMINATION – NOVEMBER 2023**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **22AG2013** | **Duration** | **3hrs** |
| **Course Name** | **GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | List out the technologies involved in Precision agriculture. | | CO1 | R | 1 |
| 2. | What is the role of remote sensing in precision agriculture? | | CO1 | U | 1 |
| 3. | What are the key components and techniques involved in precision irrigation? | | CO1 | An | 1 |
| 4. | What is an Unmanned Aerial Vehicle (Drone)? | | CO2 | A | 1 |
| 5. | What is a machine learning program in Precision Agriculture? | | CO2 | U | 1 |
| 6. | Give the details of key components involved in soil mapping. | | CO2 | E | 1 |
| 7. | Release the spectral signature study in precision agriculture. | | CO2 | U | 1 |
| 8. | What is NDVI? | | CO2 | R | 1 |
| 9. | Write a definition of Remote Sensing. | | CO3 | R | 1 |
| 10. | What does "Temporal Resolution" mean in the context of remote sensing? | | CO3 | U | 1 |
| 11. | List the important objects or elements commonly monitored for weather forecasting and monitoring using remote sensing. | | CO3 | A | 1 |
| 12. | Which technology is used to assess crop health in modern agriculture? | | CO3 | E | 1 |
| 13. | What role do crop simulation models play in agricultural processes? | | CO4 | U | 1 |
| 14. | What is STCR? | | CO5 | R | 1 |
| 15. | Classify the major components involved in STCR. | | CO5 | An | 1 |
| 16. | Write a definition for nanotechnology. | | CO6 | R | 1 |
| 17. | How can nanoparticles enhance nutrient delivery to plants in agriculture? | | CO6 | A | 1 |
| 18. | What is called as nanoparticle? | | CO6 | U | 1 |
| 19. | Construct nanopriming? | | CO6 | A | 1 |
| 20. | What is the role of nano-sensors? | | CO6 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Give the key concepts of precision agriculture. | | CO1 | R | 5 |
| 22. | Explain in detail of GPS. | | CO1 | E | 5 |
| 23. | Discuss the concept of "Variable Rate of Application" in the context of precision agriculture. | | CO2 | C | 5 |
| 24. | Elaborate on the challenges and application of Drone in Agriculture. | | CO2 | C | 5 |
| 25. | Summarize a short note on crop discrimination. | | CO3 | U | 5 |
| 26. | Assess the key component of GPS. | | CO3 | E | 5 |
| 27. | Discuss on ORYZA. | | CO4 | C | 5 |
| 28. | List the benefits of Crop Simulation Models. | | CO4 | An | 5 |
| 29. | Explain the STCR (Site-Specific Crop Management) approaches in Precision Agriculture. | | CO5 | E | 5 |
| 30. | Elaborate on the improved Fertilizer Use Efficiency (FUE) through nanotechnology. | | CO6 | C | 5 |
| 31. | Provide an extended short note about Nano Pesticides. | | CO6 | U | 5 |
| 32. | Explain the importance of Nanosensors in modern agriculture. | | CO6 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Summarizes the issues and concerns related to the adoption of precision agriculture in India. | CO1 | R | 7.5 |
|  | b. | Classify the different types of drones and explain the advantages of drone application in Agriculture. | CO2 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the details of soil mapping and its uses. | CO3 | E | 7.5 |
|  | b. | Examine the functions of GPS (Global Positioning System). | CO4 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the history of STCR (Site-Specific Crop Management) in Precision Agriculture. | CO5 | C | 7.5 |
|  | b. | Relate the uses of nanotechnology application in plant protection. | CO6 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the concepts of precision farming. |
| CO2 | Demonstrate the use of Unmanned Aerial Vehicles (UAV) in farm operations. |
| CO3 | Enhance their understanding of Geo-informatics principles and the use of GIS, GPS, Sensors  And Remote Sensing technologies in agriculture. |
| CO4 | Relate the use of various Crop Simulation Models in crop production. |
| CO5 | Apply the STCR approach for optimizing the fertilizer inputs in precision farming. |
| CO6 | Acquire knowledge of nanotechnology and its uses for scaling up farm productivity. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 13.5 | 1 |  | 1 | 5 |  | 20.5 |
| CO2 | 1 | 2 | 1 | 7.5 | 1 | 10 | 22.5 |
| CO3 | 1 | 6 | 1 |  | 13.5 |  | 21.5 |
| CO4 |  | 1 |  | 12.5 |  | 5 | 18.5 |
| CO5 | 1 |  |  | 1 | 5 | 7.5 | 14.5 |
| CO6 | 1 | 13.5 | 2 | 1 | 5 | 5 | 27.5 |
|  | | | | | | | **125** |



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| **Course Code** | **22AG2056** | **Duration** | **3hrs** |
| **Course Name** | **STATISTICAL METHODS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | **CO** | **BL** | **Marks** | |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define primary data. | CO1 | R | 1 | |
| 2. | Write the median formula for grouped data. | CO2 | R | 1 | |
| 3. | Find the mode for the data 5, 1, 12, 5, 6, 3, 11, 5. | CO2 | U | 1 | |
| 4. | Write the formula for coefficient of variation. | CO2 | R | 1 | |
| 5. | 10th percentile = ........ Decile. | CO2 | U | 1 | |
| 6. | If A and B are two dependent events, then P(A∩B) is ................. | CO3 | R | 1 | |
| 7. | The range of probability is .......... | CO3 | R | 1 | |
| 8. | The probability of a sure event is ........... | CO3 | U | 1 | |
| 9. | If *r* > 0, then, it is ............ correlation. | CO3 | U | 1 | |
| 10. | What is *b*in the regression equation *y = a + bx*? | CO5 | A | 1 | |
| 11. | Variance is square of …... | CO5 | R | 1 | |
| 12. | In standard normal distribution, the variance is ........... | CO3 | U | 1 | |
| 13. | Poisson distribution is a distribution for ........... events. | CO3 | An | 1 | |
| 14. | Sample is a subset of a ................ | CO6 | An | 1 | |
| 15. | What is sampling? | CO6 | R | 1 | |
| 16. | Define null hypothesis. | CO4 | R | 1 | |
| 17. | In one sample *t* test with *n* observations, the degree of freedom is .......... | CO4 | U | 1 | |
| 18. | If ,we accept the .......... hypothesis. | CO4 | An | 1 | |
| 19. | ........... test is used to compare more than two samples. | CO4 | A | 1 | |
| 20. | If each and every unit of population has equal chance of being included in the sample, then it is known as ........... | CO6 | E | 1 | |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Calculate the less than and more than ogive for the following data, and find the median point with a graph.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | | Frequency | 4 | 7 | 6 | 10 | 3 | | CO2 | C | 5 | |
| 22. | The weights of 6 sorghum ear heads are 45, 60, 65, 48, 100, 65 *g.* Find the mean median and mode. | CO2 | A | 5 | |
| 23. | Write any 5 difference between population and sample. | CO6 | E | 5 | |
| 24. | If = 8.53, = -2.69 and = 199.38, calculate , and interpret. | CO2 | A | 5 | |
| 25. | The yields (*kg per plot*) of a cotton variety from five plots are 8, 9, 8, 10 and 11. Find the range and standard deviation. | CO2 | An | 5 | |
| 26. | Two dice are thrown. Find the probability that,  a) Both the dice show the same number.  b) The first die shows 6. | CO3 | A | 5 | |
| 27. | Two cards are drawn from the deck one by one with replacement. What is the probability that the both cards are king? | CO3 | A | 5 | |
| 28. | The λ of a Poisson distribution is 0.5. Find *P* (*x* = 3). [e- 0.5 = 0.6065] | CO3 | An | 5 | |
| 29. | Explain correlation and its types. | CO5 | R | 5 | |
| 30. | The two lines of regression are, 8*x* – 10*y* + 66 = 0 and 40*x* – 18*y* – 214 = 0.  Find the mean values of *x* and *y*. | CO5 | E | 5 | |
| 31. | Based on field experiments, a new variety of green gram is expected to give a yield of 12.0 quintals per hectare. The variety was tested on 10 randomly selected farmer’s fields. The yield (*quintals/hectare*) were recorded as 14.3, 12.6, 13.7, 10.9, 13.7, 12.0, 11.4, 12.0, 12.6, 13.1. Do the results confirm to the expectation? | CO4 | E | 5 | |
| 32. | Explain the method of selection of samples in simple random sampling. | CO6 | R | 5 | |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | For the given data, calculate the two regression equations and find the correlation coefficient using the regression coefficients.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 2 | 4 | 5 | 6 | 8 | 11 | | *y* | 18 | 12 | 10 | 8 | 7 | 5 | | CO5 | An | | 15 |
| 34. | The frequency distribution of seed yield of 50 sesamum plants are given below. Prove that Median = *Q2* = *D5*.   |  |  | | --- | --- | | Seed yield (*g*) (*x*) | Number of plants (*f*) | | 2.5 -3.5 | 4 | | 3.5 -4.5 | 6 | | 4.5 -5.5 | 16 | | 5.5 -6.5 | 14 | | 6.5 -7.5 | 10 | | CO2 | E | | 15 |
| 35. | In a fertilizer trial, the grain yield of paddy (*kg/plot*) was observed as follows. Under ammonium chloride, the grain yield of paddy (k*g/plot*) were 42, 39, 38, 60 and 41 *kg*. Under urea, the grain yield of paddy (k*g/plot*) were 38, 42, 56, 64, 68 and 69 *kg*. Find whether there is any difference between the sources of nitrogen over yield? | CO4 | A | | 15 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify the applications of statistics to Agriculture. |
| **CO2** | Measure the central tendency and dispersion of Data. |
| **CO3** | Recognize the different probability distributions. |
| **CO4** | Utilize testing tools to verify hypotheses. |
| **CO5** | Design the experiments and make appropriate decisions. |
| **CO6** | Apply the skills of sampling in problem solving. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 |  |  |  |  |  | 1 |
| **CO2** | 2 | 2 | 10 | 5 | 15 | 5 | 39 |
| **CO3** | 2 | 3 | 10 | 6 |  |  | 21 |
| **CO4** | 1 | 1 | 16 | 1 | 5 |  | 24 |
| **CO5** | 6 |  | 1 | 15 | 5 |  | 27 |
| **CO6** | 6 |  |  | 1 | 6 |  | 13 |
|  | **18** | **6** | **37** | **28** | **31** | **5** | **125** |



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| **Course Code** | **22AG2108** | **Duration** | **3hrs** |
| **Course Name** | **ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS COMMUNICATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Entrepreneurship. | | CO2 | U | 1 |
| 2. | Describe about business entrepreneur. | | CO4 | A | 1 |
| 3. | Describe about MSME classification of entrepreneurship. | | CO5 | U | 1 |
| 4. | Define Supervision. | | CO5 | R | 1 |
| 5. | Define Leadership. | | CO5 | R | 1 |
| 6. | Define Total Quality Management (TQM). | | CO3 | U | 1 |
| 7. | Define Concurrent Control. | | CO3 | A | 1 |
| 8. | Describe about SWOT Analysis. | | CO6 | U | 1 |
| 9. | Define Market Segmentation. | | CO2 | R | 1 |
| 10. | Define Agribusiness. | | CO3 | U | 1 |
| 11. | Leader is one who wields power over his followers due to the position or office occupied by him in the organizational hierarchy  a) Autocratic Leader b) Laissez Faire Leader  c) Institutional Leader d) Democratic Leader | | CO2 | R | 1 |
| 12. | ------------- is one who is concerned with maximizing the economic returns at consistent level. He is concerned more about the survival of the firm with or without an element of growth.  a) First generation Entrepreneur b) Modern Entrepreneur  c) Professional Entrepreneur d) Classic Entrepreneur | | CO2 | U | 1 |
| 13. | An entrepreneurial process begins with the idea generation, wherein the entrepreneur identifies and evaluates the business opportunities  a) Discovery b) Resourcing  c) Developing a Business Plan d) Harvesting | | CO5 | An | 1 |
| 14. | Getting things done through others is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Business b) Marketing c) Management d) Production | | CO4 | U | 1 |
| 15. | Define Recruitment. | | CO6 | R | 1 |
| 16. | It is the process movement of the employees from one job to another without any increase in pay, status or responsibilities.  a) Promotion b) Transfer  c) Demotion d) Remuneration | | CO3 | R | 1 |
| 17. | Define Job Analysis. | | CO2 | R | 1 |
| 18. | TQM was developed by  a) Adam smith b) Philip Kotler  c) W.J. Stanton d) William Deming | | CO5 | A | 1 |
| 19. | List out the objectives of financial management. | | CO5 | A | 1 |
| 20. | Define Supply Chain Management (SCM). | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain about Clarence Danhof & Aruthur H. Cole classifications of entrepreneurs. | | CO2 | R | 5 |
| 22. | Describe about the Do’s and Don’ts of Innovation. | | CO3 | R | 5 |
| 23. | Difference between the Entrepreneur and Manager. | | CO3 | U | 5 |
| 24. | Write a short notes on steps in organizing. | | CO1 | U | 5 |
| 25. | Explain about the types of business incubators. | | CO4 | A | 5 |
| 26. | Write about the bases of departmentation. | | CO3 | R | 5 |
| 27. | Describe about ‘POSDCORB’ functions of management. | | CO3 | U | 5 |
| 28. | Describe about the techniques of direction. | | CO1 | R | 5 |
| 29. | Write about the marketing mix 4C’s. | | CO2 | A | 5 |
| 30. | Write the details of process of controlling. | | CO5 | A | 5 |
| 31. | Write a short notes on scope of operations management. | | CO6 | U | 5 |
| 32. | Describe about the supply chain management process flows. | | CO4 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about the characteristics of entrepreneurs. | CO4 | A | 7.5 |
|  | b. | Write the details of macro & micro business environment. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain about the types of Plan. | CO5 | A | 7.5 |
|  | b. | Write the details of steps in the process of staffing function. | CO4 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain about the steps in marketing feasibility. | CO1 | U | 7.5 |
|  | b. | Explain about the steps of supply chain drivers and importance of Supply chain Management. | CO3 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Distinguish different entrepreneurial traits and skills |
| CO2 | Know the agribusiness opportunities open for agriculture graduates |
| CO3 | Apply the leadership skills to get financial support for start-ups |
| CO4 | Understand the impact of economic reforms in agri-business |
| CO5 | Perform SWOT analysis of an entity for any prospective agribusiness/ideas |
| CO6 | Formulate business proposals for successful implementation of business plans |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 12.5 | - | - | - | - | 17.5 |
| CO2 | 8 | 9.5 | 5 | - | - | - | 22.5 |
| CO3 | 18.5 | 12 | 1 | - | - | - | 31.5 |
| CO4 | - | 2 | 18.5 | 7.5 | - | - | 28 |
| CO5 | 2 | 1 | 14.5 | 1 | - | - | 18.5 |
| CO6 | 1 | 6 | - | - | - | - | 7 |
|  | | | | | | | **125** |



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| **Course Code** | **22AG2308** | **Duration** | **3hrs** |
| **Course Name** | **AGROCHEMICALS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Give an example of a synthetic insecticide. | | CO1 | R | 1 |
| 2. | List any two benefits of pesticides in agriculture. | | CO1 | R | 1 |
| 3. | Define fungicide and give an example. | | CO1 | U | 1 |
| 4. | What is Bt and how is it used? | | CO2 | A | 1 |
| 5. | Explain the term surfactant. | | CO5 | E | 1 |
| 6. | Define LD50 value. | | CO5 | U | 1 |
| 7. | Determine the classification of herbicides based on the time of application. | | CO5 | R | 1 |
| 8. | What do NPV and CPV mean? | | CO2 | U | 1 |
| 9. | Expand 2,4 –D. | | CO2 | U | 1 |
| 10. | List two examples of organo-chlorine insecticides. | | CO2 | R | 1 |
| 11. | Find out the fertilizers that cause algal blooms in water bodies. | | CO3 | U | 1 |
| 12. | Specify the Bordeaux mixture's chemical composition. | | CO3 | An | 1 |
| 13. | What is bio-magnification, and what chemical played a key role in it? | | CO4 | U | 1 |
| 14. | Define nematicides and give an example. | | CO5 | R | 1 |
| 15. | Insecticides Act enacted in the year \_\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 16. | The Year in which the Fertilizer Control Order enacted is \_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 17. | Offer an example of a naturally occurring, plant-based organic insecticide. | | CO6 | U | 1 |
| 18. | Name two banned agrochemicals and their toxic effects. | | CO5 | E | 1 |
| 19. | Explain the term fumigant. | | CO5 | E | 1 |
| 20. | Define fertilizers. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explicate the impact of agrochemicals on soil-air-water-human. | | CO1 | A | 5 |
| 22. | “Endosulfan tragedy- An invisible disaster”- Explain the statement. | | CO1 | An | 5 |
| 23. | Describe the preparation of bonemeal and basic slag. | | CO6 | R | 5 |
| 24. | Give a brief explanation on “IGR”-their classification and properties. | | CO3 | U | 5 |
| 25. | Explain the manufacturing process of Urea with a neat flow chart. | | CO3 | R | 5 |
| 26. | Comment on "Agrochemicals a Boon or Bane" and provide a clear explanation of your viewpoint. | | CO1 | E | 5 |
| 27. | Briefly describe the manufacturing process of primary and secondary fertilizer combinations. | | CO3 | U | 5 |
| 28. | Categorize the herbicides according to their method of application and mode of action. | | CO2 | R | 5 |
| 29. | Short notes on qualification and power of appointment of fertilizer inspector? | | CO6 | U | 5 |
| 30. | Define agrochemicals and discuss their advantages as well as their disadvantages. | | CO1 | An | 5 |
| 31. | Write about Mixed and complex fertilizers, sources and compatibility. | | CO5 | U | 5 |
| 32. | Classify the phosphatic fertilizers according to their solubility and list out the common recommendation of phosphorus fertilizers for rice, Wheat, Maize, groundnut and Black gram. | | CO5 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Give a thorough explanation of the fungicide categorization. | CO2 | An | 7 |
|  | b. | Provide a description of pesticide classification in detailed manner. | CO1 | E | 8 |
|  |  |  |  |  |  |
| 34. | a. | Summarize the function of fertilizers and manures in sustainable agriculture. | CO5 | An | 8 |
|  | b. | Make an extensive note on pesticides and herbicides behavior in soil. | CO1 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Describe organo-phosphates organo-chlorines and carbamates in detail. | CO2 | U | 7 |
|  | b. | Describe systemic fungicides in detail, including their characteristics and applications. | CO2 | U | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the role of agrochemicals for sustainable agriculture |
| CO2 | Remember the classification and mode of action |
| CO3 | Familiarize with manufacturing, marketing and logistics |
| CO4 | Develop skills in calculation, formulations of insecticides |
| CO5 | Evaluate need based recommendation for various crops |
| CO6 | Disseminate the plant based bio pesticides for sustainable agriculture |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 1 | 5 | 17 | 13 | - | 38 |
| CO2 | 6 | 17 | 1 | 7 | - | - | 31 |
| CO3 | 5 | 11 | - | 1 | - | - | 17 |
| CO4 | 1 | 2 | - | - | - | - | 2 |
| CO5 | 8 | 6 | - | 8 | 3 | - | 25 |
| CO6 | 5 | 7 | - | - | - | - | 12 |
|  | | | | | | | **125** |



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| **Course Code** | **22AG3400** | **Duration** | **3hrs** |
| **Course Name** | **MEMBRANE TECHNOLOGY FOR WATER AND WASTEWATER TREATMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a | Discuss in detail the degrees of Membrane separation. | CO1 | U | 10 |
|  | b. | Discuss the principle of membrane separation techniques and two types of pressure driven membrane separation (Ultrafiltration, Reverse Osmosis). | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Enumerate the types of materials used for fabrication of membranes. List down the properties of the same. | CO2 | U | 10 |
|  | b. | Explain the working principle of electrical driven process (fuel cells) of separation of ions from contaminated water. | CO3 | AP | 10 |
|  |  |  |  |  |  |
| 3. | a. | Discuss in detail the membrane transport theory. What is the difference between pore flow model and solution-diffusion model? | CO3 | An | 10 |
|  | b. | Enumerate different membrane configuration in membrane modules. Differentiate between plate and frame membrane module. | CO2 | Ap | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Compare and contrast the cross flow and dead-end flow filtration in terms of its method of operation and water purification. | CO5 | Ap | 10 |
|  | b. | Distinguish between organic and inorganic membranes with examples. | CO1 | Ap | 10 |
|  |  |  |  |  |  |
| 5. | a. | Analyze ceramic *vs* polymeric membrane implementation for potable water treatment. | CO4 | An | 10 |
|  | b. | Describe the methods of thermally induced and vapour induced phase separation in fabrication of membranes. | CO1 | Ap | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Discuss in detail membrane fabrication methods (sintering and stretching) in details with a neat sketch. | CO2 | Ap | 10 |
|  | b. | Explain the impact of driving forces, non-equilibrium thermodynamics in transport of ions through membranes. | CO4 | Ap | 10 |
|  |  |  |  |  |  |
| 7. | a. | Discuss in detail the importance of fouling potential in selection of a membrane for any separation process. Distinguish between static membrane fouling and dynamic membrane fouling. | CO6 | An | 10 |
|  | b. | Explain the working principle of the characterization technique used to determine the pore size, morphology and topography data of the fabricated membrane. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss in detail how the properties such as water flux, contact angle, swelling, porosity, surface morphology and functional groups influence the performance of the membranes. | CO3 | An | 12 |
|  | b. | Briefly explain the following:   * Particulate and colloidal fouling * Organic fouling | CO6 | U | 8 |
|  | | | | | |
| CO5 | a. | List down various types of foulants with examples. | CO6 | U | 6 |
|  | b. | Discuss in detail one case study of application of polymeric membrane in treatment of industrial effluent (preparation, characterization and testing). | CO5 | E | 14 |

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|  | **COURSE OUTCOMES** |
| CO1 | Identify and fabricate suitable type of membranes (polymeric and ceramic) based on the type of treatment (drinking water, groundwater or wastewater) |
| CO2 | Optimize the operational and design parameters of polymeric membranes for specific ion removal |
| CO3 | Test the fabricated membranes for strength, porosity and stability |
| CO4 | Analyse the characteristics of membranes |
| CO5 | Evaluate the performance of polymeric/ceramic membranes in removal of ions |
| CO6 | Select the suitable type of membrane material to avoid membrane fouling |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 |  | 10 | 20 |  |  |  | 30 |
| CO3 |  |  | 10 | 22 |  |  | 32 |
| CO4 |  |  | 10 | 20 |  |  | 30 |
| CO5 |  |  | 10 |  | 14 |  | 24 |
| CO6 |  | 14 |  | 10 |  |  | 24 |
|  | | | | | | | **180** |



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| **Course Code** | **22HO2275** | **Duration** | **3hrs** |
| **Course Name** | **LANDSCAPING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define landscaping. | | CO1 | R | 1 |
| 2. | Name the garden city of India and one famous garden located there. | | CO3 | R | 1 |
| 3. | Name two garden adornments which can create mobility in landscaping. | | CO1 | R | 1 |
| 4. | What do you mean by focalization in landscaping? | | CO4 | R | 1 |
| 5. | Define arboriculture. | | CO1 | R | 1 |
| 6. | Name two flowering climbers with the botanical name. | | CO2 | R | 1 |
| 7. | How divisional lines can be achieved in landscape design? | | CO4 | R | 1 |
| 8. | What do you mean by circulation structures in landscaping? | | CO1 | R | 1 |
| 9. | Name two cycads with botanical names. | | CO1 | R | 1 |
| 10. | Mention any two species of lawn grass for tropical climate . | | CO4 | R | 1 |
| 11. | How can you create mass effect in landscaping? | | CO3 | R | 1 |
| 12. | What is CAD? | | CO5 | R | 1 |
| 13. | Name two foliage shrubs with the botanical name. | | CO2 | R | 1 |
| 14. | Who popularized the concept of bio-aesthetic planning in India? | | CO5 | R | 1 |
| 15. | ---------- and ---------- are the important components of English garden. | | CO3 | R | 1 |
| 16. | ---------and ---------- are the best group of plants for creating color schemes in landscaping. | | CO4 | An | 1 |
| 17. | List any two tree species suitable for bonsai making with the botanical name. | | CO4 | R | 1 |
| 18. | Name two succulents with the botanical name. | | CO2 | R | 1 |
| 19. | What do you mean by trophy in landscaping? | | CO4 | R | 1 |
| 20. | Persian gardens follow---------- design style while Japanese gardens follow --------- design style. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the significance of vertical garden and the types of vertical garden. | | CO4 | R | 5 |
| 22. | Explain the aftercare and maintenance operation of lawn. | | CO4 | U | 5 |
| 23. | Differentiate between terrace garden and sunken garden. | | CO4 | An | 5 |
| 24. | Discuss landscape design for an industrial area / establishment. | | CO5 | U | 5 |
| 25. | Differentiate between formal and informal style of garden design. | | CO3 | An | 5 |
| 26. | Explain the components of Mughal Garden. | | CO3 | R | 5 |
| 27. | Explain planning, designing and establishment of water garden. | | CO4 | U | 5 |
| 28. | Write the functional uses of shrubs, and trees in landscaping. | | CO2 | R | 5 |
| 29. | Differentiate between cacti and succulents. How they can be exploited in landscaping? | | CO2 | An | 5 |
| 30. | Summarize the principle of terrarium along with the method of establishment. | | CO4 | U | 5 |
| 31. | Discuss briefly the different phases in landscape planning. | | CO3 | U | 5 |
| 32. | Discuss urban landscaping. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the functional uses of lawn and methods of its establishment. | CO4 | U | 7.5 |
|  | b. | Discuss the different methods of flower arrangement with illustrations. | CO4 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the design considerations, steps involved in the establishment of roof garden, its advantages and disadvantages. | CO4 | U | 7.5 |
|  | b. | What is interior scaping? What are the establishment and maintenance operations for interior scaping? Provide examples of suitable plants. | CO1 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss different aspects of home landscaping. | CO5 | U | 7.5 |
|  | b. | Classify different styles of bonsai with illustrations. | CO4 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the principles of ornamental horticulture and landscape design |
| CO2 | Explain about the different ornamental crops and its suitability to different landscapes |
| CO3 | Distinguish the different garden types of India and in abroad |
| CO4 | Design the lawns, floral arrangements, terrariums, xeriscaping and bonsai making |
| CO5 | Discover different landscaping designs and architectures using AutoCAD and ArchiCAD |
| CO6 | Identify the factors affecting the landscape design and planning |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 12.5 | - | - | - | - | - | 12.5 |
| CO2 | 8.0 | - | - | 5.0 | - | - | 13.0 |
| CO3 | 9.0 | 5.0 | - | 5.0 | - | - | 19.0 |
| CO4 | 10.0 | 37.5 | - | 13.5 | - | - | 61.0 |
| CO5 | 2.0 | 17.5 | - | - | - | - | 19.5 |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **125** |



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| **Course Code** | **23AG3266** | **Duration** | **3hrs** |
| **Course Name** | **ADVANCES IN PLANT NUTRITION AND CROP QUALITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss in detail the mass flow and diffusion processes of nutrient movement and factors affecting the movement of nutrients in soil. | CO1 | U | 10 |
|  | b. | Describe the factors affecting the availability of micronutrients in soil. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Discuss on the functions and deficiency symptoms of micronutrients. | CO3 | U | 10 |
|  | b. | Describe the techniques involved in plant sampling and nutrient uptake assessment. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Summarize the plant nutrient constraints affecting plant growth and quality. | CO3 | E | 10 |
|  | b. | Suggest measures for the improvement of crop quality and nutrient uptake. | CO6 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Relate quantity and intensity factors of nutrients in plant nutrient uptake. | CO5 | E | 10 |
|  | b. | Discuss on the micronutrient interactions in soils and plants. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the carrier hypothesis mechanism of nutrient absorption and uptake by plant roots and factors affecting the uptake. | CO1 | An | 10 |
|  | b. | Discuss on nutrient uptake, nutrient use efficiency and harvest index of crops. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Maize crop utilized 20 cm of water for producing 10 tonnes (10Mg) of dry matter. Calculate the amount of P supplied by mass flow (Atomic weight of P 31) if the concentration of P in soil solution is 1x10-5 moles L-1. If the total amount of P taken up by the crop is 10 kg P ha-1, then compute the amount supplied by diffusion. Assume root interception is negligible. | CO1 | C | 10 |
|  | b. | Relate the influence of crop variety, plant population, types and time of application of fertilizers on nutrient utilization. | CO4 | E | 10 |
|  |  |  |  |  |  |
| 7. | a. | Discuss on the significance of organic matter in relation to nutrient availability, uptake by plants and crop quality. | CO6 | E | 10 |
|  | b. | Illustrate the potassium cycle in soil with a schematic diagram | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss on chelation and its influence on plant nutrient availability | CO5 | An | 10 |
|  | b. | Appraise the foliar fertilization technique as a measure to correct nutrient deficiencies. | CO4 | E | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Compose a table or nutrient deficiency chart as a quick guide for the identification of nutrient deficiencies in plants and suggest strategies to correct nutrient constraints. | CO3 | C | 10 |
|  | b. | Illustrate nitrogen transformations in submerged soils with schematic N cycle. | CO2 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Describe the nutrient availability and mobility in soil and plants. |
| CO2 | Explain the nutrient transformation in soil. |
| CO3 | Demonstrate the plant nutrient constraints affecting plant growth, yield and quality. |
| CO4 | Recommend management strategies to overcome nutrient deficiencies, improve nutrient uptake and nutrient use efficiency. |
| CO5 | Explain the concepts of critical levels of nutrients availability and balanced nutrient management. |
| CO6 | Correlate nutrient requirement and availability with respect to crop yield and quality. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 10 | 10 |  | 10 | 40 |
| CO2 |  | 10 | 20 |  |  |  | 30 |
| CO3 |  | 10 |  |  | 10 | 10 | 30 |
| CO4 |  | 20 |  |  | 20 |  | 40 |
| CO5 |  |  |  | 10 | 10 |  | 20 |
| CO6 |  |  |  |  | 10 | 10 | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **23AG3268** | **Duration** | **3hrs** |
| **Course Name** | **ADVANCES IN SOIL FERTILITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Formulate a set of practices for nutrient management in poly house cultivation. | CO4 | C | 10 |
|  | b. | Discuss on the application of advanced techniques like remote sensing, GIS, sensors and others in soil nutrient management and crop production. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the chemical equilibria in submerged soils. | CO3 | U | 10 |
|  | b. | Analyse the micronutrients transformation and movement in soils using models. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate nitrogen transformation and movement in soil with a detailed sketch of any one model. | CO2 | U | 10 |
|  | b. | Appraise the significance of precision farming techniques in sustaining crop production and improving the economy of the farmers. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the various plant analysis and microbial methods available to evaluate the fertility of soil. | CO4 | An | 10 |
|  | b. | Discuss on the modern concepts of fertilizer evaluation. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Appraise the significance of Decision Support Systems in the management of soil fertility. | CO5 | U | 10 |
|  | b. | Discuss on the impact of soil fertility and soil productivity under long-term intensive cropping. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Assess phosphorus transformations and movement in soil using various P models to simulate. | CO2 | E | 10 |
|  | b. | Discuss on nutrient response functions and fertility ratings for various nutrients | CO1 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Justify the use of modern techniques of fertilizer application under limited water resources. | CO6 | E | 10 |
|  | b. | Propose the steps involved in making fertilizer recommendations through the application of Mitscherlich-Bray equation. | CO6 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Propose an experiment with hybrid cotton using Soil Test Crop Response approach and furnish the steps to arrive at fertilizer recommendation. | CO4 | C | 10 |
|  | b. | Discuss in detail the modern concepts of nutrient availability. | CO1 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Plan rice cultivation in 1 ha applying the concept of Site Specific Nutrient Management. | CO6 | C | 10 |
|  | b. | Discuss on nutrient use efficiency and nutrient budgeting. | CO4 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Describe the concepts of nutrient availability and nutrient response functions |
| CO2 | Explain the models for transformation and movement of macro and micronutrients in soils |
| CO3 | Describe the Concepts of Chemical equilibria and fertilizer evaluation |
| CO4 | Discuss the various approaches of Nutrient management |
| CO5 | Demonstrate the role of Decision support system and precision farming tools in soil fertility management. |
| CO6 | Explain the various Fertilizer application techniques and nutrient scheduling for the crops. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  |  |  |  | 20 |
| CO2 |  | 10 |  | 10 | 10 |  | 30 |
| CO3 |  | 10 | 10 |  |  |  | 20 |
| CO4 |  | 10 |  | 10 |  | 20 | 40 |
| CO5 |  | 20 | 20 |  |  |  | 40 |
| CO6 |  |  |  |  | 10 | 20 | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **23AG3272** | **Duration** | **3hrs** |
| **Course Name** | **ADVANCED AGRIBUSINESS MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the role of agro based industries in economic development. | CO1 | U | 10 |
|  | b. | Describe the agribusiness models. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | List and explain the activities of APEDA. | CO6 | U | 10 |
|  | b. | Elaborate strategic sourcing and its importance in agribusiness. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the impact of globalization and liberalization on agribusiness in India. | CO6 | U | 10 |
|  | b. | Explain the various food standards in India. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the logistic management in agribusiness. | CO4 | U | 10 |
|  | b. | Explain food and agriculture value chain analysis. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the various financial management tools used in agribusiness. | CO4 | U | 10 |
|  | b. | Describe the international trade regulations related to agribusiness. | CO6 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | List the merits and demerits of contract farming. | CO5 | U | 10 |
|  | b. | Explain the forward and backward linkages in agribusiness. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe the policy support for agribusiness development in India. | CO6 | U | 10 |
|  | b. | Explain the characteristics of small scale industries in India. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the role of food regulatory agencies in India. | CO3 | U | 10 |
|  | b. | Explain 5S and 7QC tools used for product and process improvement. | CO3 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Elaborate the problems faced by agro business industries in India. | CO1 | C | 10 |
|  | b. | Elaborate the startup opportunities available in agro input and output sector. | CO1 | C | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Analyze various business models and trends in agribusiness sector |
| CO2 | Describe forward and backward linkages in agribusiness |
| CO3 | Importance of quality management in supply chain and strategies to achieve them |
| CO4 | Tackle issues of logistics and supply chain management in agribusiness |
| CO5 | Developments in supply chain networks and value chain management |
| CO6 | Analyzes implications of farm sector reforms and trade policies for businesses, farmers, consumers, and the larger economy. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 30 | - | - | - | 20 | 50 |
| CO2 | - | 10 | - | - | - | - | 10 |
| CO3 | - | 30 | - | - | - | - | 30 |
| CO4 | - | 40 | - | - | - | - | 40 |
| CO5 | - | 10 | - | - | - | - | 10 |
| CO6 | - | 40 | - | - | - | - | 40 |
| **160 20** | | | | | | | **180** |



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| **Course Code** | **23AG3274** | **Duration** | **3hrs** |
| **Course Name** | **MARKETING STRATEGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the challenges in rural marketing in India. | CO1 | U | 10 |
|  | b. | Explain international retailing. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the various retail marketing strategies in India. | CO2 | U | 10 |
|  | b. | Explain the store efficiency in marketing. | CO6 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the types of retail formats in India. | CO4 | U | 10 |
|  | b. | Elaborate the marketing strategies followed by farmers during covid 19. | CO2 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain consumer behavior in marketing. | CO3 | U | 10 |
|  | b. | Explain retail space and format planning in marketing. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain how e-commerce is different from traditional retailing. | CO4 | U | 10 |
|  | b. | Explain atmospheric qualities of e- retailing. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the key performance indicators that the retailers use to measure their performance. | CO5 | U | 10 |
|  | b. | Explain CRM strategy. | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain supply chain management. | CO2 | U | 10 |
|  | b. | Explain the issues that need to be addressed in agriculture supply chain management in India. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the concept of value creation in marketing. | CO5 | U | 10 |
|  | b. | Explain the importance of value creation in marketing. | CO5 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the challenges in e- retailing in India. | CO4 | U | 10 |
|  | b. | Elaborate the opportunities in rural marketing in India. | CO1 | C | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | The landscape of rural marketing in India and its perspectives |
| CO2 | Various marketing strategies followed in rural retailing |
| CO3 | Describes consumer choice, and behaviour |
| CO4 | Different format of retailing and globalized retail market formats |
| CO5 | Metrics for measuring the performance of value creation and competitive advantage |
| CO6 | Carryout rural market research and develop strategies |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | - | - | - | 10 | 20 |
| CO2 | - | 30 | - | - | - | 10 | 40 |
| CO3 | - | 10 | - | - | - | - | 10 |
| CO4 | - | 60 | - | - | - | - | 60 |
| CO5 | - | 40 | - | - | - | - | 40 |
| CO6 | - | 10 | - | - | - | - | 10 |
| **160 20** | | | | | | | **180** |



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| **Course Code** | **21AG1501** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF PLANT BIOCHEMISTRY AND BIOTECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | | **CO** | **BL** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | |
| 1. | The agent used to carry the gene of interest into host cell is…….. | | | CO6 | R | 1 |
| 2. | Give an example of Sulphur containing aminoacid. | | | CO1 | R | 1 |
| 3. | The sugar present in DNA is…………. | | | CO1 | R | 1 |
| 4. | The force of attraction between two water molecule is called……….. | | | CO1 | R | 1 |
| 5. | Name two peptides. | | | CO3 | R | 1 |
| 6. | Nitrogenous Base+Sugar=………….. | | | CO1 | R | 1 |
| 7. | In Chargraff law, Cytosine always pairs with………….. | | | CO1 | R | 1 |
| 8. | The site of TCA cycle is ………… | | | CO2 | R | 1 |
| 9. | Growing small parts of plant in vitro under controlled conditions is called…………… | | | CO5 | R | 1 |
| 10. | Lock and Key model was proposed by………….. | | | CO1 | R | 1 |
| 11. | The process of synthesis of protein from mRNA is called as………….. | | | CO2 | R | 1 |
| 12. | The variation seen in somatic cells of tissue culture plants is called…………… | | | CO5 | R | 1 |
| 13. | Hua 03, a Rice variety is developed through……….. culture. | | | CO5 | R | 1 |
| 14. | Bulbosum method is used to develop ……………… plants. | | | CO5 | R | 1 |
| 15. | The enzyme used to ligate Gene with vector is………… | | | CO6 | R | 1 |
| 16. | The restriction endonucleases cut the DNA at …………. Sequence. | | | CO6 | R | 1 |
| 17. | The total ATP generated when one molecule of glucose is oxidized is …….. | | | CO2 | R | 1 |
| 18. | In Glyoxylate cycle ………… is converted to sucrose. | | | CO2 | R | 1 |
| 19. | Long chain fattyacids are carried inside mitochondria by conjugating with …………… molecule. | | | CO2 | R | 1 |
| 20. | Browning of tissue culture media is due to exudation of………….. from explants. | | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | |
| 21. | Explain the lock and key model of enzyme action. | | | CO1 | An | 5 |
| 22. | Describe the different components of Nucleic acids. | | | CO1 | U | 5 |
| 23. | Discuss the beta oxidation pathway of fatty acid breakdown. | | | CO2 | U | 5 |
| 24. | What are the different properties of water? | | | CO1 | U | 5 |
| 25. | Describe different protein structure. | | | CO1 | U | 5 |
| 26. | What are the achievements, advantages and limitations of anther culture? | | | CO5 | U | 5 |
| 27. | What are the characters of good vector? | | | CO6 | U | 5 |
| 28. | Explain the different steps in micro propagation. | | | CO5 | U | 5 |
| 29. | Describe the different types of suspension culture. | | | CO4 | U | 5 |
| 30. | Explain the importance of biotechnology in agriculture. | | | CO4 | U | 5 |
| 31. | Explain the different factors that affect the enzyme activity. | | | CO1 | U | 5 |
| 32. | Explain the different DNA markers. | | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | |
| 33. | | a. | Describe the steps in PCR and the application of PCR. | CO1 | U | 7.5 |
|  | | b. | Explain metabolism of carbohydrate and add short notes on glycolysis. | CO2 | U | 7.5 |
| 34. | | a. | Discuss the different methods followed in protoplast fusion. | CO5 | U | 7.5 |
|  | | b. | Explain the double helix structure of DNA. | CO1 | U | 7.5 |
| 35. | | a. | Discuss the Agrobacterium method of gene transfer. | CO6 | U | 7.5 |
|  | | b. | Classify carbohydrates based on carbon atoms and number of sugar molecules. | CO1 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Remember the Uses, structure and classification of biomolecules. |
| CO2 | Discuss the various metabolic processes and its integration. |
| CO3 | Understand the importance of biomolecules in medicine, agriculture, pharmaceuticals and ethics. |
| CO4 | Describe the concepts in plant Biotechnology. |
| CO5 | Summaries the steps in micropropagation and in other plant cultures. |
| CO6 | Understand the different techniques in genetic engineering. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 6 | 42.5 | - | 5 | - | - | 53.5 |
| CO2 | 5 | 12.5 | - | - | - | - | 17.5 |
| CO3 | 1 | - | - | - | - | - | 1 |
| CO4 | - | 10 | - | - | - | - | 10 |
| CO5 | 5 | 17.5 | - | - | - | - | 22.5 |
| CO6 | 3 | 17.5 | - | - | - | - | 20.5 |
| Total | | | | | | | **125** |