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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | | **Questions** | | **CO** | | **BL** | | **M** | |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | | | |
| 1. | Define Credit. | | | CO1 | | R | | 1 | |
| 2. | Write about the role of credit for the improvement of Net income. | | | CO1 | | U | | 1 | |
| 3. | Write about the components in vicious cycle. | | | CO1 | | An | | 1 | |
| 4. | What are the three principle facets of disbursement in loan? | | | CO2 | | A | | 1 | |
| 5. | What are the factors determine the farm income fluctuations in output? | | | CO2 | | U | | 1 | |
| 6. | State the Formula for NPW and BCR. | | | CO2 | | R | | 1 | |
| 7. | Distinguish ‘direct finance’ from ‘indirect finance’. | | | CO3 | | An | | 1 | |
| 8. | Scale of finance is fixed based on \_\_\_\_\_\_\_ | | | CO3 | | C | | 1 | |
| 9. | State what is unit cost? | | | CO3 | | R | | 1 | |
| 10. | Define current assets with example. | | | CO4 | | R | | 1 | |
| 11. | The repayment period for the medium term loan is \_\_\_\_\_\_\_ | | | CO4 | | A | | 1 | |
| 12. | Imperial Bank of India was started in the year of \_\_\_\_\_\_\_\_ | | | CO4 | | U | | 1 | |
| 13. | Expand SWOT. | | | CO5 | | U | | 1 | |
| 14. | Define Project. | | | CO5 | | R | | 1 | |
| 15. | Motto of cooperative society is \_\_\_\_\_\_\_ | | | CO6 | | U | | 1 | |
| 16. | ICA is established on \_\_\_\_\_\_\_ | | | CO6 | | C | | 1 | |
| 17. | First cooperative land mortgage bank was initiated at \_\_\_\_\_\_\_ | | | CO6 | | R | | 1 | |
| 18. | Cite the Production credit. | | | CO1 | | U | | 1 | |
| 19. | State the formula for coefficient of variation. | | | CO2 | | E | | 1 | |
| 20. | What are the basic financial documents needed for business analysis. | | | CO4 | | An | | 1 | |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | | | |
| 21. | | Differentiate between financing in agriculture and financing in other sectors. | | CO1 | | An | | 5 | |
| 22. | | Enumerate the 3R’s in farm credit analysis. | | CO2 | | E | | 5 | |
| 23. | | Give a detail about RRB and functions. | | CO3 | | R | | 5 | |
| 24. | | Explain about balance sheet and brief about its three main parts. | | CO4 | | U | | 5 | |
| 25. | | Discuss about the components in the project report. | | CO5 | | C | | 5 | |
| 26. | | Define co-operation and explain about the Principles of co-operation. | | CO6 | | R | | 5 | |
| 27. | | Explain about classification of Agricultural credit (any three). | | CO1 | | U | | 5 | |
| 28. | | Explain about 5C’s in credit analysis. | | CO2 | | A | | 5 | |
| 29. | | Explain about KCC. | | CO3 | | R | | 5 | |
| 30. | | Explain about the tools used for measuring the economic viability. | | CO4 | | An | | 5 | |
| 31. | | Explain about lead bank. | | CO5 | | C | | 5 | |
| 32. | | Expand NAFED and give a detail description about NAFED. | | CO6 | | A | | 5 | |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | | | |
| 33. | | a. | Detail about RBI and its functions. | | CO3 | | A | | 7.5 | |
|  | | b. | Describe about world bank. | | CO1 | | U | | 7.5 | |
|  | |  |  | |  | |  | |  | |
| 34. | | a. | Explain about income statement and its components. | | CO2 | | E | | 7.5 | |
|  | | b. | Explain about the types of cooperative societies. | | CO6 | | An | | 7.5 | |
|  | |  |  | |  | |  | |  | |
| 35. | | a. | Explain about Nature and scope of farm finance. | | CO1 | | C | | 7.5 | |
|  | | b. | Explain about the functions of commercial bank. | | CO3 | | R | | 7.5 | |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 14.5 | - | 6 | - | 7.5 | 29 |
| **CO2** | 1 | 1 | 6 | - | 13.5 | - | 21.5 |
| **CO3** | 18.5 | - | 7.5 | 1 | - | 1 | 28 |
| **CO4** | 1 | 6 | 1 | 6 | - | - | 14 |
| **CO5** | 1 | 1 | - | - | - | 10 | 12 |
| **CO6** | 6 | 1 | 5 | 7.5 | - | 1 | 20.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the pest which causes white ear symptom in rice. | | CO1 | U | 1 |
| 2. | Name the pest that sucks juice from young pods of pulses. | | CO2 | R | 1 |
| 3. | Write the scientific name of brinjal shoot and fruit borer. | | CO4 | R | 1 |
| 4. | Name the alternate host for citrus butterfly. | | CO1 | R | 1 |
| 5. | The triangular cutting in coconut leaves is the characteristic symptom of which pest | | CO2 | An | 1 |
| 6. | Wrapping the pomegranate fruits is one of the management practice to control……………………… | | CO3 | An | 1 |
| 7. | Write the scientific name of cucurbit fruit fly. | | CO4 | R | 1 |
| 8. | Name the vector that transmits rice tungro virus in rice. | | CO2 | R | 1 |
| 9. | Quote the pest which produces pollu berries symptom in pepper | | CO5 | U | 1 |
| 10. | Corky scab on the guava fruit is the characteristic symptom of ……………….. | | CO2 | U | 1 |
| 11. | Write the scientific name of pink bollworm. | | CO1 | R | 1 |
| 12. | Name the pest which transmits bhendi yellow mosaic virus. | | CO1 | R | 1 |
| 13. | Clipping of rice seedling before transplanting is a management practice to control ……………… | | CO3 | U | 1 |
| 14. | Write the scientific name of parasitoid used to controlling papaya mealybug | | CO1 | R | 1 |
| 15. | Write the scientific name of American bollworm. | | CO1 | R | 1 |
| 16. | Name the attractant used for fruit fly management in cucurbits. | | CO3 | A | 1 |
| 17. | Name the chemical used for fumigation at storage storagegodowns | | CO6 | A | 1 |
| 18. | Oozing of gummy exudates from the moringa pods is due to the attack of ………………. | | CO4 | U | 1 |
| 19. | Tukra in Mulberry caused by | | CO5 | An | 1 |
| 20. | Write the scientific name of diamond back moth. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Give an illustrated account on pod borer complex in pulses and recommend control measures. | | CO2 | An | 5 |
| 22. | Summarizethe symptoms of any FIVE major pests of bhendi. | | CO3 | U | 5 |
| 23. | Describe IPM and enumerate the tools of IPM. | | CO6 | U | 5 |
| 24. | Give an illustrated explanation of pepper pests and its management | | CO5 | A | 5 |
| 25. | Describe any FIVE major pests of groundnut and suggest suitable methods of control. | | CO3 | An | 5 |
| 26. | Brief about the coconut Eriophyid mite and its control measures | | CO3 | U | 5 |
| 27. | List out the subterranean pests and Integrated pest management practices used to control the subterranean pests | | CO1 | U | 5 |
| 28. | Give the scientific names, taxonomic position and damage symptoms of mango fruit fly, mango nut weevil and mango mealy bug. | | CO4 | An | 5 |
| 29. | List out the major sucking pests in tomato and brief about the tomato fruit borer with management | | CO4 | A | 5 |
| 30. | Give an illustrated account onmajor pests of castor and recommend control measures. | | CO2 | An | 5 |
| 31. | Give short account on bionomics, damage symptom and management practices for Diamond back moth | | CO3 | U | 5 |
| 32. | Write the scientific name of rhinoceros beetle and explain its symptom and management. | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the major pests of cotton and recommend management measures. | CO3 | U | 7.5 |
|  | b. | Describe the major pests of banana and enlist the effective management strategies. | CO4 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | List out the major hopper complex in rice and brief about the management practices | CO2 | An | 7.5 |
|  | b. | List out any five major pests of cardamom and describe about biology, damage, host plants and management of shoot and capsule borer. | CO5 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Describe about the sugarcane borers and its management | CO3 | U | 7.5 |
|  | b. | Enumerate the stored product pest management strategies used to prevent and control the deterioration of stored products | CO6 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify and classify insect pests to solve problems related to pest infestation in crops by adopting best management strategies. |
| **CO2** | Analyze the types of damages caused by arthropod pests in cereals, millets and pulses, and recommend appropriate preventive and curative methods of control. |
| **CO3** | Apply management practices for effective control of oil seeds, plantation and cash crops. |
| **CO4** | Evaluate the influence of abiotic and biotic factors in the occurrence and distribution of vegetable and fruit pests, and implement control measures. |
| **CO5** | Examine the types of damages caused by arthropod pests in spices, ornamentals, medicinal plants, green manures and forest trees, and recommend appropriate preventive and curative methods of control. |
| **CO6** | Recommend management strategies to prevent deterioration of stored grains and provide best management practices to resource farmers. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 29 |  |  |  |  |  | 29 |
| **CO2** |  | 29 |  |  |  |  | 29 |
| **CO3** |  |  |  | 28 |  |  | 28 |
| **CO4** |  |  | 14 |  |  |  | 14 |
| **CO5** |  |  | 12 |  |  |  | 12 |
| **CO6** |  |  |  |  | 13 |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2153** | **Duration** | **3hrs** |
| **Course Title** | **MANAGEMENT OF BENEFICIAL INSECTS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name the substance on which the workers when fed develop into queen. | | CO1 | R | 1 |
| 2. | Central Silk Board (CSB) is located in ----------- | | CO1 | R | 1 |
| 3. | Name the order to which the lac insect belongs. | | CO1 | R | 1 |
| 4. | Expand- NBAIR. | | CO1 | R | 1 |
| 5. | State the India's rank in silk production in all over world. | | CO1 | R | 1 |
| 6. | Write any one egg parasitoid. | | CO2 | R | 1 |
| 7. | Define Apiculture. | | CO1 | R | 1 |
| 8. | Name any two plants which are good source of pollen for honey bees. | | CO2 | R | 1 |
| 9. | The ideal temperature for mulberry cultivation is -------------------- | | CO3 | U | 1 |
| 10. | Name the state that has the monopoly in the production of Muga silk. | | CO1 | R | 1 |
| 11. | Name the food plant for Eri Silkworm. | | CO3 | R | 1 |
| 12. | Write the factitious host for multiplication of *Trichogramma* spp in laboratory. | | CO3 | R | 1 |
| 13. | Name the broad-spectrum bed disinfectant used in Sericulture. | | CO5 | U | 1 |
| 14. | Write the insect that can be used to control *Parthenium* weeds. | | CO2 | R | 1 |
| 15. | Recall any one example for soil builders. | | CO2 | R | 1 |
| 16. | Write the term that denotes bee pollination. | | CO2 | R | 1 |
| 17. | Write the scientific name of rock bee. | | CO1 | R | 1 |
| 18. | Write the scientific name of mulberry silkworm. | | CO1 | R | 1 |
| 19. | Give any two mulberry varieties suitable for rainfed cultivation. | | CO3 | R | 1 |
| 20. | Name the gland responsible for silk secretion in silkworms. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the life cycle of *Bombyx mori* with suitable diagrams. | | CO1 | U | 5 |
| 22. | Differentiate any five characters of Parasitoids and Predators with example. | | CO2 | An | 5 |
| 23. | Propose innovative approaches for conserving native pollinators in intensive farming systems. | | CO6 | C | 5 |
| 24. | Explain the pruning methods of mulberry with merits and demerits. | | CO2 | U | 5 |
| 25. | Illustrate the position and structure of silk glands in the silkworm body. | | CO1 | A | 5 |
| 26. | Discuss the hive products of honey bees and their uses. | | CO6 | U | 5 |
| 27. | Investigate the role of beneficial insects in agriculture and suggest measures to enhance them. | | CO1 | An | 5 |
| 28. | Outline the communication behaviours in honey bees. | | CO1 | R | 5 |
| 29. | Discuss the bacterial diseases of honey bees and their management. | | CO5 | U | 5 |
| 30. | Explain any five apiculture equipments and their uses. | | CO3 | U | 5 |
| 31. | Assess the scope and importance of Sericulture in India | | CO6 | E | 5 |
| 32. | Demonstrate how to manage honey bee hives during dearth periods. | | CO4 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Differentiate the the five major honey bee species found in India. | CO1 | An | 8 |
|  | b. | Formulate the criteria for apiary site selection. | CO4 | C | 7 |
|  |  |  |  |  |  |
| 34. | a. | Investigate the symptoms, causes and management of grasserie, flacherie, pebrine, and muscardine diseases on silkworm. | CO5 | An | 8 |
|  | b. | Discuss the late age silkworm rearing method. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the mass production procedure of *Trichogramma* spp. | CO3 | U | 8 |
|  | b. | Discuss the steps involved in manufacturing of Shellac. | CO6 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify species of honeybees, silkworms, and lac insect and their host plants, recall equipment and practices. |
| **CO2** | Explain the role of beneficial insects viz., pollinators, scavengers, soil builders and biological control agents. |
| **CO3** | Demonstrate beekeeping, silkworm rearing, and mass multiplication of biocontrol agents. |
| **CO4** | Evaluate the seasonal management practices of beneficial insects. |
| **CO5** | Analyze the effectiveness of different pest and disease management strategies in beekeeping, sericulture, and lac culture. |
| **CO6** | Develop sustainable models for insect-based industries and eco-friendly pest control. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 15 | 5 | 5 | 13 | - | - | 38 |
| **CO2** | 5 | 5 | - | 5 | - | - | 15 |
| **CO3** | 3 | 21 | - | - | - | - | 24 |
| **CO4** | - | - | 5 | - | - | 7 | 12 |
| **CO5** | - | 6 | - | 8 | - | - | 14 |
| **CO6** | - | 12 | - | - | 5 | 5 | 22 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Centre of origin explained by \_\_\_\_\_\_\_\_\_\_. | | CO1 | U | 1 |
| 2. | When embryos and seeds develop without fertilization, it is termed as \_\_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Heterobeltiosis is also known as----------  a.Average heterosis b. Better parent heterosis c. Standard heterosis  d. Commercial heterosis | | CO1 | R | 1 |
| 4. | Vegetative propagation in potato takes place by\_\_\_\_\_\_\_\_\_\_\_        a. Tuber  b.Bulb c. Rhizome  d. Corm | | CO2 | U | 1 |
| 5. | Pollination occurring in unopened flower is known as \_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 6. | Able to tolerate the attack, withstand and give yield is called as----------  a. Susceptible b. Immune c.Resistance d. Tolerance | | CO2 | U | 1 |
| 7. | Define inbreeding depression | | CO3 | U | 1 |
| 8. | Define Marker | | CO3 | U | 1 |
| 9. | Define Hybrids | | CO3 | U | 1 |
| 10. | What is Stress and Classify the different types ? | | CO4 | R | 1 |
| 11. | What is Heterosis? | | CO4 | R | 1 |
| 12. | What is Plant Breeding | | CO4 | R | 1 |
| 13. | Classify the Mutagen | | CO5 | R | 1 |
| 14. | Different between synthetics and composites variety | | CO5 | U | 1 |
| 15. | What is Distant Hybridization | | CO6 | R | 1 |
| 16. | What is Apomixis | | CO6 | R | 1 |
| 17. | Define Germplasm | | CO6 | U | 1 |
| 18. | Expand NBPGR, IRRI | | CO1 | U | 1 |
| 19. | Define Law of homologous series? | | CO2 | U | 1 |
| 20. | Define multiline | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write in detail about Factors disturbing the equilibrium in the Hardy – Weinberg Equilibrium. | | CO1 | A | 5 |
| 22. | Explain the mechanism promoting Self-pollination. | | CO2 | R | 5 |
| 23. | Write Mechanism of Insect Resistance | | CO3 | U | 5 |
| 24. | Explain the Objectives of the Plant Breeding | | CO4 | R | 5 |
| 25. | Define ‘Self-Incompatibility’, Briefly describe the Classification of Self- incompatibility | | CO5 | R | 5 |
| 26. | Explain the Scope and  Activities of the Plant Breeding | | CO1 | R | 5 |
| 27. | What is pedigree? Describe procedure of pedigree selection. | | CO6 | U | 5 |
| 28. | Define Polyploidy and its Classification | | CO2 | U | 5 |
| 29. | What is Heterosis? Explain the types of Heterosis | | CO3 | R | 5 |
| 30. | Explain the systems of Matting | | CO4 | U | 5 |
| 31. | Explain the procedure of Single seed descent method | | CO5 | A | 5 |
| 32. | Briefly described various steps involved in release of a new variety | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the procedure, merits and Demerits of  mass line selection in self-pollinated crops | CO1 | R | 8 |
|  | b. | Write briefly about the planning the Procedure of Hybridization. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Differentiate between Pedigree method and Bulk Method | CO2 | U | 8 |
|  | b. | What is back cross? Describe the procedure of backcross method for the transfer of a recessive gene | CO3 | R | 7 |
|  |  |  |  |  |  |
| 35. | a. | Discuss in detail about Germplasm Activities. | CO5 | An | 8 |
|  | b. | What is clone? Describe procedure of clonal selection. Discuss briefly practical achievement of clonal selection | CO4 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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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 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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 15 | 9 | 5 |  |  |  | 29 |
| **CO2** | 6 | 15 |  |  |  |  | 21 |
| **CO3** | 12 | 8 |  |  |  |  | 20 |
| **CO4** | 8 | 6 | 7 |  |  |  | 21 |
| **CO5** | 7 | 1 | 5 | 8 |  |  | 21 |
| **CO6** | 2 | 6 |  | 5 |  |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Describe primary sample. | | CO2 | U | 1 |
| 2. | Define improved quality seeds. | | CO1 | R | 1 |
| 3. | Explain seed germination. | | CO1 | A | 1 |
| 4. | Describe offtypes. | | CO1 | R | 1 |
| 5. | State the colour of foundation seed and certified seed tags. | | CO1 | R | 1 |
| 6. | Explain about Liable For Rejection (L.F.R.) report. | | CO2 | A | 1 |
| 7. | Discuss the objectives of field inspection. | | CO2 | A | 1 |
| 8. | Define detasseling. | | CO2 | R | 1 |
| 9. | Explain apomixes. | | CO3 | A | 1 |
| 10. | Describe the method of acid delinting in cotton. | | CO3 | R | 1 |
| 11. | Identify the minimum isolation distance for certified seed production of paddy and maize. | | CO3 | A | 1 |
| 12. | Draw a neat diagram of seed structure of green gram. | | CO4 | A | 1 |
| 13. | Describe Aleurone layer in seeds. | | CO4 | U | 1 |
| 14. | List the types of seed germination. | | CO5 | U | 1 |
| 15. | Define seed drying. | | CO5 | R | 1 |
| 16. | List any two direct vigour test. | | CO5 | R | 1 |
| 17. | Name the Scientist who introduced the quick viability test. | | CO5 | R | 1 |
| 18. | List the chemicals used for breaking dormancy in seeds. | | CO6 | An | 1 |
| 19. | Write the Harrington thumb rule on seed moisture content. | | CO6 | A | 1 |
| 20. | Describe autogamy. | | CO6 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate certified seed and breeder Seeds. | | CO1 | An | 5 |
| 22. | List the duties of Seed Inspector during seed inspection. | | CO2 | U | 5 |
| 23. | List the characteristics of quality seeds and explain any two characters with examples. | | CO1 | U | 5 |
| 24. | Explain the mechanisms that promote self pollination in crops. | | CO3 | U | 5 |
| 25. | Explain the importance of GA3 application in paddy hybrid seed production. | | CO3 | U | 5 |
| 26. | Analyze designated diseases with relevant to paddy, maize, bajra and tomato. | | CO3 | An | 5 |
| 27. | Draw neat structural diagrams of castor and tomato seeds. | | CO4 | U | 5 |
| 28. | Write the name of the crop seeds which has the following unique structures:   1. Awns 2. Caruncle 3. Folded cotyledon 4. Curved embryo 5. Perisperm | | CO4 | A | 5 |
| 29. | Explain any four pre sowing seed treatments. | | CO5 | A | 5 |
| 30. | Write in detail about seed storage containers. | | CO5 | U | 5 |
| 31. | Discuss about the factors affecting seed storage. | | CO6 | U | 5 |
| 32. | Describe methods to be followed to improve seed set percentage in sunflower crops. | | CO6 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Infer on the factors affecting varietal purity. | CO1 | An | 10 |
|  | b. | List the phases of seed certification and explain any two phases. | CO2 | U | 5 |
|  |  |  |  |  |  |
| 34. | a. | Explain emasculation and dusting in cotton with neat diagram. | CO3 | A | 5 |
|  | b. | Discuss the process of fertilization and seed development with neat diagram. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 35. | a. | Examine seed dormancy and seed dormancy breaking treatments. | CO5 | A | 8 |
|  | b. | Summarize the process of seed germination and its phases. | CO6 | U | 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 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 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 3 | 5 | 1 | 15 | - | - | 24 |
| CO2 | 1 | 11 | 2 | - | - | - | 14 |
| CO3 | 1 | - | 7 | 15 | - | - | 23 |
| CO4 | - | 16 | 6 | - | - | - | 22 |
| CO5 | 3 | 6 | 13 | - | - | - | 22 |
| CO6 | - | 13 | 1 | 1 | - | 5 | 20 |
| 8 51 30 31 - 5 | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2204** | **Duration** | **3hrs** |
| **Course Title** | **CROP IMPROVEMENT –I (Kharif Crops)** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | List four cultivated species of cotton. | | CO1 | U | 1 |
| 2. | Write short note on polyphyletic origin in rice. | | CO1 | R | 1 |
| 3. | Define Gene for gene relationship. | | CO1 | U | 1 |
| 4. | Differentiate *Arhar* type from *Tur* type in redgram | | CO2 | U | 1 |
| 5. | State single cross hybrid. | | CO2 | R | 1 |
| 6. | Define stress and its types | | CO2 | R | 1 |
| 7. | List two cultivated types of Ragi | | CO3 | A | 1 |
| 8. | State the Ideal plant type in Maize | | CO3 | U | 1 |
| 9. | Write the difference between ‘vertical resistance’ and ‘horizontal resistance’. | | CO3 | A | 1 |
| 10. | What is monoecious | | CO4 | A | 1 |
| 11. | List the importance of forage crops | | CO4 | U | 1 |
| 12. | What is the center of origin of pearl millet | | CO4 | U | 1 |
| 13. | What is Quality Protein Maize | | CO5 | U | 1 |
| 14. | Define Drought avoidance | | CO5 | R | 1 |
| 15. | Name the person who first developed hybrid rice. | | CO6 | R | 1 |
| 16. | Cite ‘Detasselling in maize’ | | CO6 | A | 1 |
| 17. | Define heterosis | | CO6 | A | 1 |
| 18. | Cite the progenitor for red gram crop. | | CO1 | U | 1 |
| 19. | State the recommended ratio of female rows to male rows is in hybrid Redgram production. | | CO2 | R | 1 |
| 20. | Define ‘germplasm’ | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the classification of maize based on kernel character | | CO1 | A | 5 |
| 22. | Explain the breeding objective of soybean | | CO2 | U | 5 |
| 23. | Explain the Classification of  Cowpea | | CO3 | R | 5 |
| 24. | Write the procedure for fiber extraction in jute | | CO4 | A | 5 |
| 25. | Explain the male sterile line maintenance in red gram | | CO5 | U | 5 |
| 26. | Explain pod development in groundnut | | CO6 | R | 5 |
| 27. | Briefly explain floral biology of brinjal with help of diagram and its pollination methods | | CO1 | R | 5 |
| 28. | Classification of sunflower and list out the wild sunflower | | CO2 | U | 5 |
| 29. | Discuss the mechanism of Insect resistances | | CO3 | A | 5 |
| 30. | Explain the Components of plant genetic resources | | CO4 | U | 5 |
| 31. | Discuss the breeding objective of okra | | CO5 | R | 5 |
| 32. | Explain the breeding objective of forage crops | | CO6 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss in detail about hybrid seed production in Rice | CO1 | A | 7.5 |
|  | b. | Explain the breeding objectives and methods used in sorghum |  | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss about the Classification , breeding objectives and breeding methods  of castor | CO2 | A | 7.5 |
|  | b. | Briefly discuss about the breeding objectives and breeding method followed in sesame. |  | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | How the abiotic stress tolerant crops are generated? Explain the different methods. | CO3 | R | 7.5 |
|  | b. | Explain the quality breeding in crops. |  | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Review the origin and diversity of different crops. |
| **CO2** | Conceptualize the components of inheritance and various crop improvement techniques. |
| **CO3** | Demonstrate the different breeding techniques for the genetic improvement in kharif crops. |
| **CO4** | Evaluate the adaptability, stability, quality parameters, biotic and abiotic stress of various kharif crops. |
| **CO5** | Utilize hybrid seed production techniques in cultivation of kharif crops. |
| **CO6** | Acquire skills on design and layout field experiments to analyze the quality characters of donor parents |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6 | 10.5 | 12.5 |  |  |  | 29 |
| **CO2** | 9.5 | 6 | 8.5 |  |  |  | 24 |
| **CO3** | 5 | 13.5 | 14.5 |  |  |  | 33 |
| **CO4** | - | 8 | 6 |  |  |  | 14 |
| **CO5** | 6 | 6 | - |  |  |  | 12 |
| **CO6** | - | 6 | 7 |  |  |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Ecology. | | CO1 | R | 1 |
| 2. | State about Mesopause. | | CO1 | R | 1 |
| 3. | State about Renewable resources. | | CO1 | R | 1 |
| 4. | What does ‘Food chains’ mean. | | CO2 | U | 1 |
| 5. | Define Consumers. | | CO2 | U | 1 |
| 6. | Define Biodiversity. | | CO2 | U | 1 |
| 7. | Tell about rainwater harvesting. | | CO3 | An | 1 |
| 8. | Define Global Warming. | | CO3 | An | 1 |
| 9. | Write about nuclear accident. | | CO3 | An | 1 |
| 10. | Define BOD and COD. | | CO4 | A | 1 |
| 11. | Differentiate Pollutant from Contaminant. | | CO4 | A | 1 |
| 12. | Define Hazards. | | CO4 | A | 1 |
| 13. | Define Disaster. | | CO5 | A | 1 |
| 14. | State what is Warm core. | | CO5 | A | 1 |
| 15. | State the full form of UNESCO & IUCN. | | CO6 | R | 1 |
| 16. | What is Central Dense Overcast . | | CO6 | E | 1 |
| 17. | Name some NGOs Community involved in Disaster Management. | | CO6 | R | 1 |
| 18. | Define Environment. | | CO1 | R | 1 |
| 19. | What does ‘Red data book’ mean. | | CO2 | U | 1 |
| 20. | Define Solid Waste Management. | | CO4 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List the different segments of atmosphere? | | CO1 | R | 5 |
| 22. | Write short notes on Endemic species in India | | CO2 | U | 5 |
| 23. | Write short notes on Ozone layer depletion | | CO3 | An | 5 |
| 24. | Write short notes on pollutants and its types | | CO4 | A | 5 |
| 25. | Write short notes about Tsunamis | | CO5 | A | 5 |
| 26. | Role of media in Disaster management | | CO6 | E | 5 |
| 27. | List out the types of Indian Forest | | CO1 | R | 5 |
| 28. | Mention the strategies for conservation of biodiversity | | CO2 | U | 5 |
| 29. | Write short notes on Wild life Protection Act | | CO3 | An | 5 |
| 30. | Write short notes on Climate Change | | CO4 | A | 5 |
| 31. | Discuss about Bhopal gas tragedy | | CO5 | A | 5 |
| 32. | Mention the Key functions of environmental law | | CO6 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss briefly about Mining, Mining methods and its Impact | CO1 | R | 8 |
|  | b. | Explain in detail about DAMS as a water resource | CO1 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Write an essay about solid waste Management and its methods | CO2 | U | 8 |
|  | b. | Write in detail about Biodiversity and its types | CO2 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Write a detailed note on Acid rain and its effect and solutions | CO3 | An | 8 |
|  | b. | Write in detail about Rain Water Harvesting and its methods | CO3 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 29 |  |  |  |  |  | 29 |
| **CO2** |  | 29 |  |  |  |  | 29 |
| **CO3** |  |  |  | 28 |  |  | 28 |
| **CO4** |  |  | 14 |  |  |  | 14 |
| **CO5** |  |  | 12 |  |  |  | 12 |
| **CO6** |  |  |  |  | 13 |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Differentiate between mineralization and immobilization. | | CO1 | U | 1 |
| 2. | Define Guano fertilizer. | | CO1 | R | 1 |
| 3. | Name two chloride-sensitive crops suitable for Potassium Sulphate (K₂SO₄) application. | | CO1 | R | 1 |
| 4. | List any three primary calcium-containing minerals. | | CO2 | R | 1 |
| 5. | Enumerate the various forms of nitrogen present in soil. | | CO2 | R | 1 |
| 6. | State any two functions and deficiency symptoms of Sulphur in plants. | | CO2 | U | 1 |
| 7. | List two nutrients that are immobile within the plant system. | | CO3 | R | 1 |
| 8. | Define Precision Agriculture. | | CO3 | U | 1 |
| 9. | What is a Nano Fertilizer? | | CO3 | U | 1 |
| 10. | Give two examples of indicator plants and the nutrients they indicate. | | CO4 | R | 1 |
| 11. | State the primary objectives of Integrated Nutrient Management (INM). | | CO4 | R | 1 |
| 12. | What is the function of Urease inhibitors? | | CO4 | U | 1 |
| 13. | State the primary role of soil amendments. | | CO5 | R | 1 |
| 14. | What does LCC stand for in nutrient management? | | CO5 | R | 1 |
| 15. | Name one remote sensing tool used for variable rate fertilizer application. | | CO6 | R | 1 |
| 16. | Expand the abbreviations DSSIFER and VDK. | | CO6 | R | 1 |
| 17. | What are the 4R's of nutrient stewardship? | | CO6 | R | 1 |
| 18. | What is Green Manure? | | CO1 | U | 1 |
| 19. | Define 'Hidden Hunger' in plants. | | CO2 | U | 1 |
| 20. | State two main features of the Fertilizer Control Order (FCO). | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Classify organic manures and state the basis for their classification. | | CO1 | A | 5 |
| 22. | Explain the major transformation processes of Phosphorus in soil. | | CO2 | U | 5 |
| 23. | Explain the following soil fertility evaluation methods:  i) Crop logging  ii) Critical nutrient concept | | CO3 | U | 5 |
| 24. | Discuss the importance of soil testing as a tool for soil fertility evaluation. | | CO4 | U | 5 |
| 25. | Elucidate the significance of Integrated Nutrient Management (INM) on soil health. | | CO5 | U | 5 |
| 26. | Strategies to Improving Nutrient Management in Dryland Agriculture Systems | | CO6 | A | 5 |
| 27. | What are Enriched Farm Yard Manures (EFYM)? Explain with suitable examples. | | CO1 | U | 5 |
| 28. | What are complex fertilizers? Discuss their advantages and list three examples. | | CO2 | U | 5 |
| 29. | List the critical levels of major macronutrients (N, P, K) in soil for a staple crop. | | CO3 | R | 5 |
| 30. | Explain the procedure for conducting a rapid plant tissue test for nutrient diagnosis. | | CO4 | A | 5 |
| 31. | Describe the processes involved in determining and improving Nitrogen Use Efficiency (NUE). | | CO5 | A | 5 |
| 32. | Discuss the soil-plant-environment factors affecting nutrient availability to plants. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Illustrate the process of composting for sugarcane trash and coir pith using a detailed flow chart. | CO1 | A | 10 |
|  | b. | List out Aerobic & anaerobic method of composting with example | CO1 | A | 5 |
|  |  |  |  |  |  |
| 34. | a. | Describe Arnon and Stout's criteria of essentiality for plant nutrients. | CO2 | U | 7.5 |
|  | b. | Classify essential plant nutrients based on their biochemical behavior and list the form in which they are taken up by plants. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Describe various methods of fertilizer application. | CO6 | A | 7.5 |
|  | b. | Explain the fertigation technique, highlighting its principle, requirements, and advantages. | CO6 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 7 | 20 | 0 | 0 | 0 | 29 |
| **CO2** | 3 | 26 | 0 | 0 | 0 | 0 | 29 |
| **CO3** | 6 | 7 | 15 | 0 | 0 | 0 | 28 |
| **CO4** | 3 | 6 | 5 | 0 | 0 | 0 | 14 |
| **CO5** | 2 | 5 | 5 | 0 | 0 | 0 | 12 |
| **CO6** | 3 | 5 | 5 | 0 | 0 | 0 | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Rice tungro viral disease is transmitted by------ | | CO1 | U | 1 |
| 2. | In sorghum downy mildew disease, the pathogen produces leaf shredding symptoms due to the production of which resting spore? | | CO1 | R | 1 |
| 3. | Charcoal rot disease of maize is caused by----------. | | CO1 | U | 1 |
| 4. | The transformation of floral parts into leafy structures in pearl millet is----symptom | | CO2 | R | 1 |
| 5. | Small brown to chestnut dusty pustules (uredosori) appear on the lower surface of leaves is the characteristics symptoms of ------- in ground nut | | CO2 | A | 1 |
| 6. | Red gram powdery mildew disease is caused by-------. | | CO2 | A | 1 |
| 7. | Soybean wilt diseaseis caused by--------. | | CO3 | An | 1 |
| 8. | Small brown circular to elongated spots appear on leaves which eventually develop into large elongated spindle shaped areas is the characteristics symtoms of ------ disease in finger millet. | | CO3 | R | 1 |
| 9. | In green gram powdery mildew disease, the pathogen produces which type of asexual spores? | | CO3 | A | 1 |
| 10. | Minute, orange-yellow coloured, raised pustules appear with powdery masses appear on the leaves is the characteristics symptoms of------ disease in castor. | | CO4 | R | 1 |
| 11. | Tobacco frog eye spot disease is caused by------. | | CO4 | An | 1 |
| 12. | Guava rust disease is caused by--------. | | CO4 | An | 1 |
| 13. | Banana bunchy top viral disease is transmitted by------. | | CO5 | R | 1 |
| 14. | Papaya powdery mildew disease is caused by------. | | CO5 | A | 1 |
| 15. | The development of “V” shaped chlorotic to yellow lesions from the leaf margin which turn brown it’s a characteristics symptom of------- disease in crucifers. | | CO6 | An | 1 |
| 16. | Bhendi yellow vein mosaic viral disease is transmitted by-----? | | CO6 | E | 1 |
| 17. | Tomato spotted wilt virus is transmitted by-----. | | CO6 | C | 1 |
| 18. | The important diagnostic symptom is “flaccidity” of leaves, resembling the ribs of mammals is the symptoms of------- disease in coconut. | | CO1 | C | 1 |
| 19. | Rhizome rot disease of ginger is caused by-------. | | CO2 | E | 1 |
| 20. | Tea blister blight disease is caused by------. | | CO4 | E | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the differences between Bacterial leaf blight and Bacterial leaf streak? | | CO1 | A | 5 |
| 22. | Differentiate maize downy mildew disease from sorghum downy mildew disease. | | CO2 | U | 5 |
| 23. | Write the symptoms and management practices of Collar rot disease in groundnut | | CO3 | C | 5 |
| 24. | Explain the symptoms, pathogen and management practices of soybean mosaic virus? | | CO4 | R | 5 |
| 25. | Explain about Black shank disease in tobacco? | | CO5 | R | 5 |
| 26. | Describe the symptoms, pathogen characters and management of Banana bunchy top disease? | | CO6 | R | 5 |
| 27. | Write the symptoms, pathogen character and management practices of Stem rot / Foot rot diseases in papaya? | | CO1 | C | 5 |
| 28. | Explain about Phomopsis blight disease in brinjal? | | CO2 | A | 5 |
| 29. | Illustrate the damping off disease in tomato? | | CO3 | An | 5 |
| 30. | Write the symptoms and management practices of bean anthracnose? | | CO4 | E | 5 |
| 31. | Explain the symptoms, pathogen character and management practices of stem bleeding disease in coconut. | | CO5 | A | 5 |
| 32. | Describe the coffee rust disease. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the fungal diseases of rice. | CO1 | R | 8 |
|  | b. | Explain the diseases of groundnut. | CO4 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain about fungal diseases of banana. | CO2 | R | 7 |
|  | b. | Elaborate the diseases of cruciferous vegetable. | CO5 | U | 8 |
|  |  |  |  |  |  |
| 35. | a. | Describe the bacterial and viral disease in tomato. | CO3 | An | 8 |
|  | b. | Elaborate the coconut diseases. | CO6 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 9 | 2 | 5 | - | - | 6 | 22 |
| **CO2** | 8 | 5 | 7 | - | 1 | - | 21 |
| **CO3** | 1 | - | 1 | 14 | - | 5 | 21 |
| **CO4** | 13 | - | - | 2 | 6 | - | 21 |
| **CO5** | 6 | 8 | 6 | - | - | - | 20 |
| **CO6** | 10 | - | - | 1 | 1 | 8 | 20 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define IPM. | | CO1 | R | 1 |
| 2. | Explain the term food chain with a neat diagram. | | CO1 | C | 1 |
| 3. | Describe a roving survey in pest monitoring. | | CO1 | A | 1 |
| 4. | Define host plant resistance in crops. | | CO2 | U | 1 |
| 5. | Give an account of biological control with suitable examples. | | CO2 | U | 1 |
| 6. | Cite about chemical control. | | CO2 | A | 1 |
| 7. | Define the term epidemiology. | | CO3 | R | 1 |
| 8. | Write about LD50 and LC50. | | CO3 | A | 1 |
| 9. | List out phanerogamic parasite with suitable example | | CO3 | R | 1 |
| 10. | Describe pest surveillance and its importance. | | CO4 | A | 1 |
| 11. | Mention the different types of pest surveys. | | CO4 | A | 1 |
| 12. | List all the documents / certificates which are needed for import and export of plant materials. | | CO4 | A | 1 |
| 13. | Explain about neonicotinoid insecticides. | | CO5 | A | 1 |
| 14. | State about Insect Growth Regulators. | | CO5 | U | 1 |
| 15. | Define Quarantine in plant protection. | | CO6 | A | 1 |
| 16. | Write a note on Pest Risk Analysis (PRA). | | CO6 | A | 1 |
| 17. | Cite what is Invasive Alien Species (IAS) | | CO6 | U | 1 |
| 18. | Define Natality and Mortality in pest populations. | | CO1 | U | 1 |
| 19. | Define Hyperparasitism with example. | | CO2 | R | 1 |
| 20. | Cite about Forecasting. | | CO4 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write about concept of IPM. | | CO1 | A | 5 |
| 22. | Write about Entomopathogenic fungus with examples. | | CO2 | U | 5 |
| 23. | Enumerate classification of disease based on survey, occurrence and distribution. | | CO3 | A | 5 |
| 24. | Give a diagrammatic representation of pest population based on ETL, EIL and GEP. | | CO4 | U | 5 |
| 25. | Explain the role of abiotic factors in pest management. | | CO5 | R | 5 |
| 26. | List out the ideal qualities of an insecticides. | | CO6 | U | 5 |
| 27. | Explain the mechanism of physical and chemical control of diseases. | | CO1 | A | 5 |
| 28. | Define host plant resistance and enumerate its mechanism with examples. | | CO2 | U | 5 |
| 29. | Write a short note on antiviral principle. | | CO3 | U | 5 |
| 30. | Write about different types of pest survey. | | CO4 | R | 5 |
| 31. | Write about the classification of insecticides based on mode of action. | | CO5 | U | 5 |
| 32. | Advantages and disadvantages of Using Insect Growth Regulators | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain IPM and its components and discussed on mechanical control of IPM. | CO1 | U | 7.5 |
|  | b. | Define parasitoid. Write its types. Explain their role and advantage in pest management. | CO2 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write about the special methods of fungicide application in plant disease management | CO3 | U | 7.5 |
|  | b. | What is pest outbreak and enumerate the various factors responsible for it? | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain disease forecasting and its methods. | CO5 | U | 7.5 |
|  | b. | Explain about biotechnological approaches in plant disease management. | CO6 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 8.5 | 11 |  |  | 1 | 21.5 |
| **CO2** | 1 | 12 | 8.5 |  |  |  | 21.5 |
| **CO3** | 2 | 12.5 | 6 |  |  |  | 20.5 |
| **CO4** | 12.5 | 5 | 4 |  |  |  | 21.5 |
| **CO5** | 5 | 13.5 | 1 |  |  |  | 19.5 |
| **CO6** | 5 | 6 | 8.5 |  |  |  | 20.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The special type feed given to young ones is called as ------------- | | CO4 | A | 1 |
| 2. | Meat from goat is called ------------------- | | CO1 | R | 1 |
| 3. | Define concentrates. | | CO4 | R | 1 |
| 4. | Sudden death of cattle with blood oozing out from natural orifices is ------------ | | CO6 | A | 1 |
| 5. | Highest milk producing state in India is --------------- | | CO2 | R | 1 |
| 6. | Define ovulation. | | CO2 | R | 1 |
| 7. | The heaviest cattle breed in India is ------------- | | CO3 | R | 1 |
| 8. | Define Artificial Insemination (AI). | | CO2 | R | 1 |
| 9. | In sheep, Enterotoxemia is caused by ------------------ (Causative organism). | | CO6 | A | 1 |
| 10. | The last one born in the litter of pigs is called as ----------------- | | CO3 | R | 1 |
| 11. | Red revolution denotes ------------ production. | | CO1 | A | 1 |
| 12. | India ranks ----------- in milk production among world. | | CO1 | U | 1 |
| 13. | Tightly curled horn pattern seen in ------------ | | CO2 | A | 1 |
| 14. | The native breed of bull used for Jallikattu is ----------- | | CO2 | A | 1 |
| 15. | Define deworming. | | CO6 | A | 1 |
| 16. | The needle teeth in piglets are ---------- pairs at the time of birth. | | CO2 | R | 1 |
| 17. | Cite the gestation period on cow. | | CO2 | U | 1 |
| 18. | The first faeces voided after birth of calf is called as ------------------ | | CO5 | U | 1 |
| 19. | The amount of colostrum fed to dairy calves after birth is ----------- of its body weight. | | CO4 | A | 1 |
| 20. | Define out breeding. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write the signs of estrus of a cow which is in heat. | | CO3 | A | 5 |
| 22. | Classify the breeds of cattle. | | CO2 | U | 5 |
| 23. | Explain the Clinical signs, treatment and prevention of Foot and Mouth Disease (FMD) affecting cattle. | | CO6 | A | 5 |
| 24. | Describe the care and management of piglets in a farm. | | CO5 | R | 5 |
| 25. | Differentiate between roughage and concentrate with examples. | | CO4 | U | 5 |
| 26. | Write about the grower management of poultry. | | CO5 | A | 5 |
| 27. | List the guidelines to be followed in farm site selection. | | CO5 | R | 5 |
| 28. | Explain about litter management in poultry farms. | | CO5 | A | 5 |
| 29. | Write about the goat breeds of Tamil Nadu. | | CO3 | A | 5 |
| 30. | Enumerate the advantage and disadvantage of silage making. | | CO4 | R | 5 |
| 31. | Describe the types of brooders. | | CO5 | R | 5 |
| 32. | List the importance of feeding green fodder to animals. | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about the care and management of pregnant cow and new born calf. | CO3 | U | 7.5 |
|  | b. | 1. Write about the different system goat rearing and explain about types of shed.   ii) Explain about slatted floor system of goat rearing. | CO5 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write about the procedure for Artificial Insemination (AI) in cow. | CO3 | A | 7.5 |
|  | b. | Explain about Hatchery operation. | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Differentiate between deep litter and cage system of poultry rearing. | CO5 | U | 7.5 |
|  | b. | Describe the methods of pregnancy diagnosis in cow. | CO2 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 1 | 1 |  |  |  | 3 |
| **CO2** | 5 | 14.5 | 1 |  |  |  | 20.5 |
| **CO3** | 2 | 7.5 | 17.5 |  |  |  | 27 |
| **CO4** | 11 | 5 | 2 |  |  |  | 18 |
| **CO5** | 15 | 16 | 17.5 |  |  |  | 48.5 |
| **CO6** | 0 | 0 | 8 |  |  |  | 8 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2452** | **Duration** | **3hrs** |
| **Course Title** | **FARM MACHINERY AND POWER** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The land holding of a small farmer is…….. | | CO2 | R | 1 |
| 2. | Air cooled engine has …….. | | CO1 | R | 1 |
| 3. | In manual harvesting, a man hour needed to harvest one hectare of paddy is about……. | | CO1 | U | 1 |
| 4. | Harvesting of wheat with bullock drawn reaper and making bundles could require ……. | | CO3 | U | 1 |
| 5. | The calorific value of gasoline is ………… | | CO4 | A | 1 |
| 6. | A machine used to cut herbage crops and leave them in swath is ………. | | CO4 | U | 1 |
| 7. | Flywheel is made of…………. | | CO3 | R | 1 |
| 8. | A tractor drawn semi mounted mower is operated by ……….. | | CO5 | R | 1 |
| 9. | Hammer mill thresher is operated by ………… | | CO1 | R | 1 |
| 10. | The single cylinder engine generally used in----- | | CO6 | R | 1 |
| 11. | A metal having highest melting point ………… | | CO6 | R | 1 |
| 12. | An angular moment of front wheels is governed by operator through a system is known as….. | | CO6 | R | 1 |
| 13. | Ignition temperature of IC engine varies form --- | | CO5 | U | 1 |
| 14. | The normal depth of ploughing by subsoiler is………. | | CO4 | A | 1 |
| 15. | The stubble type of mould board is mostly suitable for ………. | | CO3 | R | 1 |
| 16. | Seed drill are used for ……………. | | CO1 | U | 1 |
| 17. | Choke controls the amount of …………… | | CO2 | R | 1 |
| 18. | A clutch used in power tiller is ……………. | | CO2 | R | 1 |
| 19. | Engine is device, which converts…………… | | CO1 | U | 1 |
| 20. | The volume of liquid required for ground spraying of field crop is…………. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define Paddy reaper | | CO1 | R | 5 |
| 22. | Define Sowing and List out the sowing methods. | | CO2 | A | 5 |
| 23. | List Out the Systems of IC Engine. | | CO1 | An | 5 |
| 24. | State Internal Combustion Engine. | | CO3 | R | 5 |
| 25. | List out the sources of Farm Power. | | CO3 | E | 5 |
| 26. | State about the objectives of Primary Tillage | | CO3 | R | 5 |
| 27. | Explain Conoweeder with its sketch. | | CO5 | An | 5 |
| 28. | Explain about the Components of IC Engine. | | CO5 | E | 5 |
| 29. | Write a short note about Mould board Plough. | | CO6 | E | 5 |
| 30. | State a) Wheelbase b) Track c) Ground Clearence d) Turning Space d) Cage wheel | | CO4 | E | 5 |
| 31. | Define governor. | | CO3 | U | 5 |
| 32. | Give a Flowchart for Power Transmission System. | | CO4 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define Primary Tillage and list out the primary tillage implements and explain any three of them with its sketch. | CO2 | R | 8 |
|  | b. | Explain Seed cum fertilizer drill. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain about Combine Harvester with its outline. | CO5 | A | 7 |
|  | b. | Give in detail about the Systems of IC Engine. | CO6 | An | 8 |
|  |  |  |  |  |  |
| 35. | a. | Write in brief about plant protection equipments. | CO6 | E | 7 |
|  | b. | Write in detail about Two Stroke Cycle Engine with its sketch | CO3 | A | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Analyze the working of two stroke and four stroke IC engine |
| **CO2** | Solve problems in the functioning of farm implements |
| **CO3** | Select an appropriate tillage implements needed for the farm |
| **CO4** | Experiment with different equipment used in agricultural fields from planting to harvesting |
| **CO5** | Predict the cost benefit economics of various farm implements |
| **CO6** | Illustrate the need of farm mechanization |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 8.5 | 11 |  |  | 1 | 21.5 |
| **CO2** | 1 | 12 | 8.5 |  |  |  | 21.5 |
| **CO3** | 2 | 12.5 | 6 |  |  |  | 20.5 |
| **CO4** | 12.5 | 5 | 4 |  |  |  | 21.5 |
| **CO5** | 5 | 13.5 | 1 |  |  |  | 19.5 |
| **CO6** | 5 | 6 | 8.5 |  |  |  | 20.5 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Outline the ICT. | | CO1 | R | 1 |
| 2. | Compare the GIS systems with GPS systems. | | CO2 | R | 1 |
| 3. | Define Agro-Informatics and its importance. | | CO1 | U | 1 |
| 4. | Explain about E-Agriculture with 2 agriculture apps. | | CO4 | R | 1 |
| 5. | Define ‘IoT’. | | CO1 | U | 1 |
| 6. | Define ‘Precision agriculture’ | | CO4 | R | 1 |
| 7. | State the role of crop doctor in agriculture. | | CO1 | R | 1 |
| 8. | Examine the Crop Simulation Model. | | CO4 | U | 1 |
| 9. | State any 2 online photos and video editing tools of ICT in agriculture? | | CO6 | U | 1 |
| 10. | State the full form of DSS. | | CO3 | R | 1 |
| 11. | List out the uses of DBMS in agriculture. | | CO3 | U | 1 |
| 12. | Interpret the Preparation of contingent crop. | | CO3 | U | 1 |
| 13. | Cite about SIS (soil information system). | | CO4 | U | 1 |
| 14. | Describe about expert system in agriculture | | CO1 | U | 1 |
| 15. | Define: World Wide Web (WWW). | | CO3 | U | 1 |
| 16. | Explain about Uzhavan App | | CO2 | R | 1 |
| 17. | Describe the Remote Sensing. | | CO2 | U | 1 |
| 18. | Write about AGRINSET. | | CO3 | R | 1 |
| 19. | Cite about the Decision support system | | CO5 | R | 1 |
| 20. | State about Crop calendar. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the role of ICT in E –Agriculture & Advantages of ICT in E-agriculture. | | CO2 | A | 5 |
| 22. | Distinguish the difference between RAM and ROM. | | CO1 | A | 5 |
| 23. | Explain about expert system in agriculture & Key Applications in Agriculture. | | CO1 | U | 5 |
| 24. | Develop the contingent crop planning and crop calendar using IT tools. | | CO1 | U | 5 |
| 25. | Design of a Spatial decision support system. | | CO2 | R | 5 |
| 26. | Identify the advantages and disadvantage of E agriculture. | | CO3 | U | 5 |
| 27. | What is GIS? Explain any two uses of GIS. | | CO2 | A | 5 |
| 28. | Summarize the various components Graphical User Interface (GUI). | | CO3 | R | 5 |
| 29. | Describe about TNAU Agri Tech portal. | | CO2 | U | 5 |
| 30. | Generalize the different types of computer models in agriculture. | | CO2 | A | 5 |
| 31. | List out the various types of network. | | CO3 | A | 5 |
| 32. | Interpret the how smart phone mobile apps useful in agriculture. | | CO1 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Elaborate the IT applications for computation of water and nutrients requirement for crops. | CO1 | U | 7.5 |
|  | b. | Describe the computer-controlled devices (automated systems) for Agri-input management. | CO2 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Interpret the expert system for agriculture & components of the expert system. | CO1 | R | 7.5 |
|  | b. | Examine the key features & applications of SIS. | CO3 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Illustrate the spatial decision support system concepts, components and applications in Agriculture. | CO4 | R | 7.5 |
|  | b. | Categories the steps for implementing contingent crop planning? Examples of contingent scenarios. | CO3 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 14.5 | 20.5 | 5.0 | - | - | - | 40.0 |
| **CO2** | 14.5 | 6.0 | 15.0 | - | - | - | 35.5 |
| **CO3** | 15.5 | 15.5 | 5.0 | - | - | - | 36.0 |
| **CO4** | 9.5 | 2.0 | - | - | - | - | 11.5 |
| **CO5** | 1.0 | - | - | - | - | - | 1.0 |
| **CO6** | - | 1.0 | - | - | - | - | 1.0 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What was the first ever patent given in India? | | CO1 | R | 1 |
| 2. | Define plagiarism | | CO1 | R | 1 |
| 3. | Expand GATT | | CO1 | R | 1 |
| 4. | Expand TKDL | | CO6 | R | 1 |
| 5. | Define Copyrights | | CO2 | U | 1 |
| 6. | What is plant breeder rights? | | CO4 | R | 1 |
| 7. | Expand WIPO | | CO2 | R | 1 |
| 8. | What is benefit sharing? | | CO6 | U | 1 |
| 9. | What is Madrid protocoal related to? | | CO2 | R | 1 |
| 10. | Identify the benefits of GI | | CO4 | R | 1 |
| 11. | Expand TRIPS | | CO4 | U | 1 |
| 12. | What are trade secrets? | | CO4 | R | 1 |
| 13. | Expand CSIR | | CO1 | R | 1 |
| 14. | Tell what is FR act? | | CO4 | R | 1 |
| 15. | When was biological diversity act introduced? | | CO5 | R | 1 |
| 16. | Expand PGR | | CO3 | R | 1 |
| 17. | List out any four GI’s given so far in India | | CO3 | R | 1 |
| 18. | What is compulsory licensing? | | CO1 | R | 1 |
| 19. | Tell the meaning of trademark | | CO2 | R | 1 |
| 20. | What are farmer’s rights? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the role and functions of GATT | | CO1 | U | 5 |
| 22. | Write short notes on patent claims and opposition | | CO1 | U | 5 |
| 23. | Narrate the differences between copyrights and trademark | | CO2 | An | 5 |
| 24. | Outline the history and importance of UPOV | | CO4 | R | 5 |
| 25. | Write short notes on Berne convention | | CO2 | U | 5 |
| 26. | How to register plant varieties under PPV&FR | | CO4 | A | 5 |
| 27. | Describe the IPR contribution on food and agriculture | | CO6 | U | 5 |
| 28. | Write short notes on patent search and patent database | | CO3 | An | 5 |
| 29. | Explain about researcher rights | | CO5 | U | 5 |
| 30. | Write short notes on IPR protection | | CO1 | U | 5 |
| 31. | Write short notes on plant genetic resources | | CO3 | U | 5 |
| 32. | Write short notes on Budapest treaty | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about International treaty on plant genetic resources for food and agriculture | CO6 | U | 7.5 |
|  | b. | Explain about traditional knowledge and its protection types | CO4 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain about Indian Biological diversity act and its importance | CO5 | U | 7.5 |
|  | b. | Write in detail about researcher’s rights | CO2 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Summarize the role, importance and procedural formalities of patent | CO5 | U | 7.5 |
|  | b. | Explain the procedural formalities in availing farmers’ rights | CO3 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 5 | 15 | - | - | - | - | 20 |
| **CO2** | 8 | 6 | 7.5 | 5 | - | - | 26.5 |
| **CO3** | 2 | 5 | 7.5 | 5 | - | - | 19.5 |
| **CO4** | 9 | 9.5 | 5 | - | - | - | 23.5 |
| **CO5** | 1 | 20 | - | - | - | - | 21 |
| **CO6** | 1 | 13.5 | - | - | - | - | 14.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **21AG3015** | **Duration** | **3hrs** |
| **Course Title** | **CURRENT TRENDS IN AGRONOMY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | List the primary physiological factors for yield variation in crops. | | CO1 | R | 1 |
| 2. | Define field capacity in soil water relationships. | | CO2 | R | 1 |
| 3. | Describe WTO roles in agricultural export. | | CO2 | U | 1 |
| 4. | Explain any two components of precision agriculture. | | CO3 | A | 1 |
| 5. | Describe contract farming. | | CO3 | U | 1 |
| 6. | Define organic farming as per IFOAM. | | CO3 | R | 1 |
| 7. | Summarize the certification process in organic farming. | | CO3 | U | 1 |
| 8. | Evaluate any one indigenous technical knowledge practice used in organic farming. | | CO4 | An | 1 |
| 9. | Explain the main objectives of crop residue management. | | CO4 | U | 1 |
| 10. | Define allelopathy. | | CO2 | R | 1 |
| 11. | Describe remote sensing. | | CO6 | U | 1 |
| 12. | Explain GM crops and give one example. | | CO5 | U | 1 |
| 13. | Define conservation agriculture (CA). | | CO4 | R | 1 |
| 14. | List the key principle of sustainable agriculture. | | CO4 | R | 1 |
| 15. | Explain any one potential benefit of CA under climate change. | | CO4 | An | 1 |
| 16. | What does seed certification ensure? | | CO5 | R | 1 |
| 17. | Define hybrid seed production. | | CO5 | R | 1 |
| 18. | Recall the farming system approach. | | CO2 | R | 1 |
| 19. | Define dryland farming. | | CO2 | R | 1 |
| 20. | Explain any one modern precision tool used in mechanized crop production. | | CO6 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the agro-physiological basis of yield variation in crops. | | CO1 | An | 5 |
| 22. | Discuss recent advances in understanding the soil–plant–water relationship. | | CO2 | U | 5 |
| 23. | Describe the role of the modern tools in soil fertility management. | | CO3 | U | 5 |
| 24. | Write short notes on precision agriculture and its components. | | CO6 | A | 5 |
| 25. | Explain the concept and advantages of contract farming in India. | | CO3 | A | 5 |
| 26. | Write short notes on certification and labeling of organic products. | | CO5 | A | 5 |
| 27. | Describe the importance and applications of GIS, GPS, and remote sensing in crop management. | | CO6 | U | 5 |
| 28. | Explain the methods and significance of crop residue management in multiple cropping systems. | | CO4 | An | 5 |
| 29. | Discuss modern mechanization tools in crop production and their role in precision agriculture. | | CO6 | U | 5 |
| 30. | Define and explain the principles of conservation agriculture. | | CO4 | R | 5 |
| 31. | Explain the importance of modern tool in organic farming. | | CO3 | U | 5 |
| 32. | Write a note on sustainable agriculture and its holistic systems approach. | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain how recent scientific advances help in optimizing crop productivity and resource use efficiency. | CO1 | U | 7 |
|  | b. | Analyze the impact of globalization and WTO agreements on Indian agriculture. | CO2 | An | 8 |
|  |  | **OR** |  |  |  |
| 34. | a. | Elaborate on the concept, principles, and technologies involved in precision agriculture. Discuss how mechanization and digital tools enhance input efficiency and productivity. | CO6 | A | 8 |
|  | b. | Explain certification, labeling, and marketing strategies for organic products. | CO5 | U | 7 |
|  |  | **OR** |  |  |  |
| 35. | a. | Explain the core principles of conservation agriculture (CA). Discuss its potential benefits for soil health, water conservation, and carbon sequestration. | CO4 | U | 8 |
|  | b. | Discuss the relevance of indigenous traditional knowledge (ITK). | CO2 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand about the new developments and innovations in agronomy. |
| **CO2** | Apply the advanced crop production techniques and system approaches. |
| **CO3** | Acquire knowledge on the recent trends in organic agriculture and procedures for organic certification. |
| **CO4** | Optimize various resource management approaches for conservation agriculture. |
| **CO5** | Gain knowledge on seed production techniques and certification procedures. |
| **CO6** | Adopt recent technological applications like GIS, GPS, and remote sensing in crop management. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 7 | - | 5 | - | - | 13 |
| **CO2** | 4 | 13 | 5 | 8 | - | - | 30 |
| **CO3** | 1 | 12 | 6 | - | - | - | 19 |
| **CO4** | 7 | 9 | - | 7 | - | - | 23 |
| **CO5** | 2 | 8 | 5 | - | - | - | 15 |
| **CO6** | - | 11 | 13 | 1 | - | - | 25 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| **Course Code** | **21AG3017** | **Duration** | **3hrs** |
| **Course Title** | **IRRIGATION MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define delta. | | CO1 | R | 1 |
| 2. | Define irrigation interval. | | CO2 | U | 1 |
| 3. | --------- method of irrigation is highly suitable for a sloping area. | | CO2 | U | 1 |
| 4. | 1 TMC = ------ liter of water. | | CO1 | R | 1 |
| 5. | International Water Management Research Institute located at --------. | | CO1 | R | 1 |
| 6. | The ideal EC of water is about ------ for crop production. | | CO4 | U | 1 |
| 7. | Define SAR. | | CO4 | R | 1 |
| 8. | Define the “E” factor for the IR formula. | | CO3 | U | 1 |
| 9. | Give the formula for Darcy's Law. | | CO3 | U | 1 |
| 10. | The energy for pure water is about -------. | | CO2 | U | 1 |
| 11. | ------- method of irrigation is suitable for salt affected regions. | | CO2 | U | 1 |
| 12. | ------ crop used as an indicator plant for irrigation management. | | CO1 | U | 1 |
| 13. | ETo = C --------. | | CO2 | R | 1 |
| 14. | Define infiltration. | | CO3 | R | 1 |
| 15. | Define kc. | | CO2 | R | 1 |
| 16. | 1 ha mm = ------ liters of water. | | CO1 | R | 1 |
| 17. | Differentiate between command area and catchment area. | | CO6 | U | 1 |
| 18. | -------- method of water harvesting is suitable for humid regions. | | CO6 | U | 1 |
| 19. | Define duty of water. | | CO3 | R | 1 |
| 20. | Define deficit irrigation. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain soil water movement with a neat diagram. | | CO1 | U | 5 |
| 22. | Illustrate and elaborate on the corrugation method of irrigation. | | CO2 | A | 5 |
| 23. | Write about the water balance method for irrigation management. | | CO3 | A | 5 |
| 24. | Summarize the soil plant atmosphere continuum. | | CO2 | E | 5 |
| 25. | List out the empirical method to estimate ET and explain about Modified Blaney-Criddle method. | | CO3 | U | 5 |
| 26. | Differentiate between ET, ETo, ETc, and ETa. | | CO5 | U | 5 |
| 27. | Summarize the soil water potential and its types with a formula. | | CO2 | E | 5 |
| 28. | Explain water harvesting techniques for arid and semi-arid regions. | | CO6 | U | 5 |
| 29. | Write a short note on IW/CPE approach with suitable examples. | | CO5 | A | 5 |
| 30. | Classify the types of agricultural drainage with a neat diagram. | | CO6 | An | 5 |
| 31. | Write a short note on IWM approach for irrigation management. | | CO5 | A | 5 |
| 32. | Illustrate water production function and its concepts and applications. | | CO4 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Differentiate between Irrigability and Land Capability Classification. | CO3 | An | 7 |
|  | b. | Develop a micro irrigation project for 1 ha of cotton + blackgram intercropping system. | CO2 | C | 8 |
|  |  |  |  |  |  |
| 34. | a. | Summarize the soil moisture constant with a neat diagram. | CO1 | E | 7 |
|  | b. | Write a short note on agronomic measures to manage the water stress. | CO4 | A | 8 |
|  |  |  |  |  |  |
| 35. | a. | Write about various water use efficiencies and their applications in irrigation management. | CO5 | A | 7 |
|  | b. | Explain about various irrigation polices implemented in India and Tamil Nadu, and their impact on irrigation management. | CO6 | A | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the role of water in relation to metabolic and physiological functions of plants |
| **CO2** | Acquire knowledge on advanced strategies for irrigation management practices |
| **CO3** | Gain in-depth understanding about the water requirement of modern crop production systems |
| **CO4** | Evaluate the water quality parameters and management measures |
| **CO5** | Explain the techniques of efficient water use |
| **CO6** | Utilize the knowledge for the command area development |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 4 | 6 | - | - | 7 | - | 17 |
| **CO2** | 2 | 4 | 5 | - | 10 | 8 | 29 |
| **CO3** | 2 | 8 | 5 | 7 | - | - | 22 |
| **CO4** | 1 | 1 | 13 | - | - | - | 15 |
| **CO5** |  | 5 | 16 | - | - | - | 21 |
| **CO6** | 1 | 7 | 8 | 5 | - | - | 21 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Give any two examples for Geographical Indications registered in India | | CO2 | R | 1 |
| 2. | Define ‘patent’ | | CO2 | U | 1 |
| 3. | Define ‘biodiversity protection’. | | CO3 | R | 1 |
| 4. | Expand WTO | | CO1 | R | 1 |
| 5. | State the original works which received copyright | | CO2 | U | 1 |
| 6. | Expand ITK | | CO1 | R | 1 |
| 7. | Define ‘innovation’ | | CO2 | R | 1 |
| 8. | Give an example for trade secret | | CO2 | R | 1 |
| 9. | What is industrial design in IPR. | | CO2 | U | 1 |
| 10. | List the items which cannot be patented. | | CO1 | U | 1 |
| 11. | Expand CIMMYT | | CO5 | R | 1 |
| 12. | List out the types of plagiarism. | | CO3 | U | 1 |
| 13. | Define protectable subject matter | | CO4 | R | 1 |
| 14. | Show the differences between patent and trade secret | | CO2 | R | 1 |
| 15. | Expand PGR | | CO5 | R | 1 |
| 16. | Expand ITPGRFA | | CO5 | R | 1 |
| 17. | Define biodiversity protection | | CO3 | R | 1 |
| 18. | State the specific role of GATT. | | CO1 | R | 1 |
| 19. | State the validation time period of a patent in India. | | CO2 | R | 1 |
| 20. | Outline the salient features of trademark | | CO2 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write short notes on farmer’s rights | | CO3 | U | 5 |
| 22. | Identify various innovations which were patented so far and summarize | | CO1 | A | 5 |
| 23. | Explain the various acts and treaties passed related to IPR | | CO1 | R | 5 |
| 24. | Write a brief account on material transfer agreements | | CO6 | U | 5 |
| 25. | List out the initiatives taken towards national biodiversity protection | | CO6 | R | 5 |
| 26. | Distinguish between researcher’s rights and Breeder’s rights | | CO3 | A | 5 |
| 27. | Write short notes on licensing of technologies | | CO4 | U | 5 |
| 28. | Write a brief account on research collaboration agreements | | CO6 | U | 5 |
| 29. | Narrate the role of incubation centers in IPR | | CO5 | U | 5 |
| 30. | Write short notes on protection of plant varieties | | CO4 | U | 5 |
| 31. | Write short notes on the working procedure of compulsory licensing | | CO6 | A | 5 |
| 32. | What is traditional knowledge? Explain with suitable examples | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the various intellectual property rights with suitable examples | CO2 | R | 7.5 |
|  | b. | Explain about the role of IPR in protection of biotechnology matter | CO5 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain about the procedural formalities in getting farmer’s rights | CO1 | R | 7.5 |
|  | b. | Describe in detail about the implications of GATT and TRIPS | CO1 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain about the procedural formalities in getting breeder’s rights | CO3 | U | 7.5 |
|  | b. | Explain the scope and importance of IPR in the field of agriculture | CO2 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 15.5 | 8.5 | 5 | - | - | - | 29 |
| **CO2** | 12.5 | 16.5 | - | - | - | - | 29 |
| **CO3** | 2 | 13.5 | 5 | - | - | - | 20.5 |
| **CO4** | 1 | 10 | - | - | - | - | 11 |
| **CO5** | 3 | 12.5 | - | - | - | - | 15.5 |
| **CO6** | 5 | 10 | 5 | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | List any two crops commonly grown in high altitude regions. | | CO1 | R | 1 |
| 2. | Give two examples of tropical fruits. | | CO1 | U | 1 |
| 3. | Define olericulture. | | CO1 | R | 1 |
| 4. | Judge the maturity indices of mango. | | CO6 | U | 1 |
| 5. | Name any two plant propagation structures. | | CO4 | R | 1 |
| 6. | Judge the maturity indices of banana. | | CO6 | U | 1 |
| 7. | Name any two temperate vegetables. | | CO1 | R | 1 |
| 8. | Define arboriculture. | | CO1 | R | 1 |
| 9. | Write the botanical name for tomato and papaya. | | CO1 | A | 1 |
| 10. | Name the high rainfall zone in Tamil Nadu. | | CO1 | R | 1 |
| 11. | Name the media is commonly used for air layering. | | CO4 | R | 1 |
| 12. | Name the districts in Tamil Nadu where turmeric is cultivated. | | CO1 | R | 1 |
| 13. | Differentiate between rootstock and scion. | | CO4 | U | 1 |
| 14. | Write any two plants that belong to the Myrtaceae family. | | CO1 | A | 1 |
| 15. | List any two nitrogen fertilizers for growth development of fruit crops. | | CO6 | R | 1 |
| 16. | Give two examples of perennial vegetables. | | CO1 | U | 1 |
| 17. | Write any two plants that belong to the Solanaceae family. | | CO1 | A | 1 |
| 18. | Name any two biofertilizers. | | CO4 | R | 1 |
| 19. | List any two rooting hormones. | | CO4 | R | 1 |
| 20. | Write any two plants that belong to the Brassicaceae family. | | CO1 | A | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Distinguish between physiological maturity and horticultural maturity. | | CO6 | E | 5 |
| 22. | Classify horticultural crops based on roots. | | CO1 | An | 5 |
| 23. | Describe layout and planning for nutritional garden. | | CO3 | U | 5 |
| 24. | Explain the principles and objectives of training and pruning. | | CO5 | A | 5 |
| 25. | Describe the methods of irrigation in horticultural crops. | | CO6 | U | 5 |
| 26. | Classify horticultural crops based on plant parts. | | CO1 | An | 5 |
| 27. | Explain the principles of organic production in horticultural crops. | | CO6 | A | 5 |
| 28. | Describe the fundamental principles and common practices used in orchard management. | | CO6 | U | 5 |
| 29. | Explain the methods of breaking seed dormancy in horticultural crops. | | CO4 | A | 5 |
| 30. | Discuss about growing media for plant propagation. | | CO4 | U | 5 |
| 31. | Describe the causes of unfruitfulness in horticultural crops and the measures to overcome it. | | CO2 | U | 5 |
| 32. | Classify horticultural crops based on bearing habit. | | CO2 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List and explain the different methods of grafting with illustrations. | CO4 | R | 7.5 |
|  | b. | Explain the various cropping systems adopted in horticulture along with diagrammatic representation. | CO4 | A | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | List and explain the different types of plant growth regulators and their applications in horticultural crops. | CO5 | R | 7.5 |
|  | b. | Explain the various training and pruning methods used in horticulture along with diagrammatic representations. | CO5 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the various factors affecting fruit set in horticultural crops. | CO2 | A | 7.5 |
|  | b. | Describe the different planting methods used in horticultural crops with their diagrammatic representations. | CO4 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Relate the classification of Agroclimatic zones with congeniality for production of horticultural crops |
| **CO2** | Analyze the various factors of growth and development with production of horticultural crops |
| **CO3** | Apply the concepts of layout of kitchen and nutritional garden |
| **CO4** | Adopt propagation techniques for commercial nursery enterprises |
| **CO5** | Apply the concepts of training, pruning, fruitset, and regulation of bearing in horticultural crops |
| **CO6** | Demonstrate orchard establishment and management |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6 | 2 | 4 | 10 | - | - | 22 |
| **CO2** | - | 5 | 7.5 | 5 | - | - | 17.5 |
| **CO3** | - | 5 | - | - | - | - | 5 |
| **CO4** | 16.5 | 13.5 | 7.5 | - | - | - | 37.5 |
| **CO5** | 7.5 | - | 12.5 | - | - | - | 20 |
| **CO6** | 1 | 12 | 5 | - | 5 | - | 23 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| **Course Code** | **21HO2271** | **Duration** | **3hrs** |
| **Course Title** | **PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | | **CO** | | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | |
| 1. | Explain the nutritional value of vegetable crops. | | | CO1 | | An | 1 |
| 2. | Define a kitchen garden and list its major components. | | | CO1 | | C | 1 |
| 3. | Describe the maturity indices of tomato and brinjal. | | | CO1 | | R | 1 |
| 4. | Enumerate five important varieties of chilli and capsicum. | | | CO2 | | R | 1 |
| 5. | What is meant by sex ratio in cucurbits? mention with examples. | | | CO2 | | E | 1 |
| 6. | Discuss the role of growth regulators in pumpkin and cucumber. | | | CO2 | | U | 1 |
| 7. | Mention the scientific name and economic part of peas and French bean. | | | CO3 | | R | 1 |
| 8. | What is whiptail disorder in Cole crops? Explain its cause and management. | | | CO3 | | R | 1 |
| 9. | Describe the special cultural practices commonly followed in root crops. | | | CO3 | | A | 1 |
| 10. | Explain the methods of propagation in potato. | | | CO4 | | R | 1 |
| 11. | State the climatic requirements for the cultivation of onion and garlic. | | | CO4 | | R | 1 |
| 12. | Mention the seed rate and method of sowing for palak and Amaranthus. | | | CO4 | | U | 1 |
| 13. | Describe the commercial propagation methods followed in coccinea, chow chow, and curry leaf. | | | CO5 | | U | 1 |
| 14. | Provide the scientific names and families of turmeric and ginger. | | | CO5 | | R | 1 |
| 15. | List any five important varieties or hybrids of black pepper and cardamom. | | | CO6 | | R | 1 |
| 16. | What is top working in nutmeg. | | | CO6 | | C | 1 |
| 17. | Mention the economic part and family of clove and cinnamon. | | | CO6 | | R | 1 |
| 18. | What is black heart disorder in potato? | | | CO1 | | A | 1 |
| 19. | What is blossom end rot in tomato? | | | CO2 | | U | 1 |
| 20. | List the early maturing varieties of potato. | | | CO4 | | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | |
| 21. | Explain the scope and importance of vegetable and spice crops. | | | CO1 | | E | 5 |
| 22. | Briefly discuss the scope and importance of vegetables and spices. | | | CO2 | | U | 5 |
| 23. | Write about the important varieties, intercultural practices, and harvesting methods of brinjal. | | | CO3 | | A | 5 |
| 24. | Define sex forms in cucurbits and describe the methods used for their modification. | | | CO4 | | An | 5 |
| 25. | Mention the important varieties, fertilizer requirements, and maturity indices of watermelon. | | | CO5 | | R | 5 |
| 26. | Discuss the intercultural practices, recommended varieties, and manure application in French bean. | | | CO6 | | U | 5 |
| 27. | Describe the climatic requirements, sowing and transplanting practices, and maturity groups of cauliflower. | | | CO1 | | R | 5 |
| 28. | List the major disorders of onion and garlic and explain their management practices. | | | CO2 | | U | 5 |
| 29. | Explain the methods of seed sowing, important varieties, and harvesting practices of Amaranthus. | | | CO3 | | E | 5 |
| 30. | Write short notes on the processing techniques of turmeric. | | | CO4 | | E | 5 |
| 31. | Describe the climate and soil requirements, maturity indices, and yield potential of cardamom. | | | CO5 | | R | 5 |
| 32. | Write notes on the physiological disorders of potato. | | | CO6 | | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | |
| 33. | a. | Describe the production technology of muskmelon. | CO1 | | R | | 7.5 |
|  | b. | Explain the production technology of knol-khol. | CO1 | | U | | 7.5 |
|  |  |  |  | |  | |  |
| 34. | a. | Discuss the production technology of Moringa. | CO2 | | U | | 7.5 |
|  | b. | Enumerate the physiological disorders of tomato and their management practices. | CO2 | | A | | 7.5 |
|  |  |  |  | |  | |  |
| 35. | a. | Write notes on the propagation methods, training systems, varieties and hybrids of black pepper. | CO3 | | E | | 7.5 |
|  | b. | Explain the production technology of garlic. | CO3 | | R | | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Get sensitized on the role of vegetables and spices in human nutrition |
| **CO2** | Acquire knowledge on varietal wealth of vegetable and spice crops |
| **CO3** | Equipped to identify and manage physiological disorders of vegetable crops |
| **CO4** | Demonstrate skills in nursery management and production technology of vegetable and spices |
| **CO5** | Analyze the critical stages of harvesting of vegetables and spice crops |
| **CO6** | Apply knowledge on processing technology of spice crops for gainful employment. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 16 |  | 1 | 1 | 6 | 1 | 24 |
| **CO2** | 1 | 15 |  |  | 1 |  | 17 |
| **CO3** | 2 | 2 | 6 |  | 10 |  | 20 |
| **CO4** | 3 | 1 | 2 | 3 | 5 | 5 | 19 |
| **CO5** | 11 | 1 |  |  |  |  | 12 |
| **CO6** | 2 | 5 |  | 5 |  | 1 | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **21AG2004** | **Duration** | **3hrs** |
| **Course Title** | **CROP PRODUCTION TECHNOLOGY – I (*KHARIF* CROPS) 1+1** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | What are the methods available for fibre separation from jute | | CO1 | R | 1 |
| 2. | Write the constraints in the adoption of SRI | | CO3 | U | 1 |
| 3. | Define economic importance of sorghum | | CO5 | U | 1 |
| 4. | Define sorghum poisoning | | CO3 | U | 1 |
| 5. | Define soya milk | | CO3 | R | 1 |
| 6. | Write the importance of millets in nutrition | | CO2 | U | 1 |
| 7. | Write the steps involved in hay making | | CO3 | R | 1 |
| 8. | Write about the organic fertilizer | | CO1 | U | 1 |
| 9. | What is silage in agriculture | | CO5 | U | 1 |
| 10. | Define Puddling | | CO4 | U | 1 |
| 11. | Define sett treatment in sugarcane | | CO5 | U | 1 |
| 12. | What do you mean by ideotype | | CO3 | A | 1 |
| 13. | What is Rouging | | CO6 | U | 1 |
| 14. | Define Field preparation | | CO1 | R | 1 |
| 15. | Define Water requirement | | CO1 | A | 1 |
| 16. | Why are Kharif crops dependent on the monsoon season | | CO4 | An | 1 |
| 17. | What is the importance of pearl millet | | CO2 | U | 1 |
| 18. | Define essential amino acids of maize | | CO2 | R | 1 |
| 19. | Define drip irrigation | | CO5 | A | 1 |
| 20. | Define weed | | CO1 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write a short note on morphological classification of maize | | CO3 | R | 5 |
| 22. | What are the steps involved in soil preparation | | CO4 | A | 5 |
| 23. | Explain the acid delinting process in cotton. | | CO5 | A | 5 |
| 24. | Write about the nutrient value of greengram | | CO3 | U | 5 |
| 25. | What are the advantages of organic fertilizers | | CO4 | R | 5 |
| 26. | Discuss about the methods of irrigationand its importance | | CO5 | A | 5 |
| 27. | Write down the important of plant protection and harvesting of blackgram | | CO6 | A | 5 |
| 28. | Explain the package of practices for ratoon sorghum. | | CO1 | R | 5 |
| 29. | What are the important characteristics of good quality seed | | CO5 | U | 5 |
| 30. | Explain the Importance of pulse production for India | | CO2 | U | 5 |
| 31. | Explain the types and importance of forage crops | | CO5 | A | 5 |
| 32. | Write the five economic importance of groundnut. | | CO1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the advantage and disadvantage of Dapog method of rice seedlings | CO3 | U | 7.5 |
|  | b. | Describe about the Field preparation for groundnut cultivation | CO4 | R | 7.5 |
| 34. | a. | Explain about the **benefits, types and precautions of seed treatment** | CO6 | An | 7.5 |
|  | b. | Describe about the skill followed in field preparation of Cumbu napier crops | CO1 | U | 7.5 |
| 35. | a. | Explain about main field preparation for irrigated sorghum crop | CO6 | R | 7.5 |
|  | b. | Write the important characteristics of fodder cowpea. Explain the origin, area, distribution and Soil and climatic requirement fodder cowpea | CO5 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **22AG2013** | **Duration** | **3hrs** |
| **Course Title** | **GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING (1+1)** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define precision farming. | | CO1 | R | 1 |
| 2. | What is Global Positioning System? | | CO1 | U | 1 |
| 3. | \_\_\_\_\_\_\_\_\_\_ is a modern agricultural management approach that leverages digital technologies to monitor and enhance farming operations and productivity. | | CO1 | U | 1 |
| 4. | What is meant by payload capacity? | | CO2 | R | 1 |
| 5. | What is drone pollination?. | | CO2 | U | 1 |
| 6. | What is a sensor? | | CO3 | A | 1 |
| 7. | Define remote sensing | | CO3 | R | 1 |
| 8. | A multispectral sensor is a \_\_\_\_\_\_\_\_\_\_ detector with a few spectral bands. | | CO3 | R | 1 |
| 9. | Write the Spectral range of Hyperspectral Sensor is \_\_\_\_\_\_\_\_\_\_ mm | | CO3 | U | 1 |
| 10. | What is a model? | | CO4 | An | 1 |
| 11. | Name the sensors that use GPS satellites to determine the latitude, longitude, and altitude of a specific location within a given area. | | CO4 | R | 1 |
| 12. | \_\_\_\_\_\_\_\_\_ requires data related to weather, crop, soil, management practices and insect pests. | | CO4 | An | 1 |
| 13. | This sensor collects chemical data from the soil by detecting specific ions, providing information such as pH levels and soil nutrient content. What is the name of this sensor? | | CO3 | E | 1 |
| 14. | What is Hybrid Drones? | | CO2 | R | 1 |
| 15. | \_\_\_\_\_\_\_\_ operate by emitting energy toward objects or areas and subsequently detecting and measuring the returned signals. | | CO3 | U | 1 |
| 16. | According to \_\_\_\_\_\_\_\_\_, growth is controlled not by the overall abundance of resources, but by the resource or nutrient in shortest supply, known as the limiting factor. | | CO5 | R | 1 |
| 17. | The abbreviation for DSSIFER is \_\_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 18. | \_\_\_\_\_\_\_\_\_\_ is an aircraft without a human pilot on board. | | CO2 | A | 1 |
| 19. | Define nanotechnology. | | CO6 | R | 1 |
| 20. | Having one or more dimensions of the order of 100 nm or less is called as \_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss in detail the concept of Variable Rate Application (VRA) or Variable Rate Technology (VRT) its role in precision agriculture. | | CO1 | R | 5 |
| 22. | Elaborate about grid sampling and its benefits in agriculture? | | CO1 | A | 5 |
| 23. | What are the advantages of rotor type UAVs over fixed wing UAVs? | | CO2 | An | 5 |
| 24. | Brief about the pilot license for flying a drone in India. | | CO2 | U | 5 |
| 25. | Brief about the government's initiatives to promote drone usage in agriculture. | | CO2 | R | 5 |
| 26. | What are the advantages of Using Drones in Agriculture? | | CO2 | An | 5 |
| 27. | Explain the principles and theories of electromagnetic radiation. | | CO3 | U | 5 |
| 28. | List the different types of agriculture sensors and briefly describe about it. | | CO3 | R | 5 |
| 29. | Enumerate the various applications of geoinformatics in precision agriculture. | | CO3 | A | 5 |
| 30. | What is Photogrammetry and write a brief note about it? | | CO3 | R | 5 |
| 31. | Write a brief note on SPADMeter and Field Scout CM 1000 meter. | | CO5 | U | 5 |
| 32. | Write a brief note on the following  a.Nanoherbicides b.Nanosensor | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the concepts of precision agriculture and highlight its importance. | CO1 | U | 7.5 |
|  | b. | Write an essay about how sensors are used in precision agriculture | CO3 | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the different kinds of models | CO4 | R | 7.5 |
|  | b. | Define the Global Positioning System (GPS) and explain its applications in modern agricultural practices | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | What is STCR and how does it offer advantages over traditional or blanket fertilizer recommendations? | CO5 | A | 7.5 |
|  | b. | Write a brief note on the following   1. Controlled release of chemical nutrients in fertilizers using nano-coatings. 2. Improving the efficiency of biofertilizers through the application of nanoparticles. | CO6 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6 | 9.5 | 5 |  |  |  | **20.5** |
| **CO2** | 7 | 13.5 | 1 | 10 |  |  | **31.5** |
| **CO3** | 19.5 | 7 | 6 |  | 1 |  | **33.5** |
| **CO4** | 8.5 |  |  | 2 |  |  | **10.5** |
| **CO5** | 2 | 5 | 7.5 |  |  |  | **14.5** |
| **CO6** | 14.5 |  |  |  |  |  | **14.5** |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG2056** | **Duration** | **3hrs** |
| **Course Title** | **STATISTICAL METHODS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define statistics. | | CO1 | R | 1 |
| 2. | List two uses of statistics in agriculture. | | CO1 | U | 1 |
| 3. | Explain tabulation of data? | | CO1 | R | 1 |
| 4. | List any two types of diagrams used in data presentation. | | CO1 | R | 1 |
| 5. | Define arithmetic mean. | | CO2 | R | 1 |
| 6. | What is range? | | CO2 | R | 1 |
| 7. | Define probability. | | CO3 | R | 1 |
| 8. | State the multiplication theorem of probability. | | CO3 | U | 1 |
| 9. | Write the variance of a Poisson distribution? | | CO3 | R | 1 |
| 10. | Define correlation. | | CO4 | R | 1 |
| 11. | Explain the purpose of a scatter diagram? | | CO4 | U | 1 |
| 12. | Write the formula for Karl Pearson’s coefficient of correlation. | | CO4 | R | 1 |
| 13. | Define regression coefficient. | | CO5 | R | 1 |
| 14. | Define null hypothesis? | | CO5 | U | 1 |
| 15. | List use of Chi-square test. | | CO5 | R | 1 |
| 16. | Visualize ANOVA table | | CO6 | U | 1 |
| 17. | Define one-way classification. | | CO6 | R | 1 |
| 18. | Define simple random sampling? | | CO6 | R | 1 |
| 19. | Differentiate between sampling and census. | | CO6 | U | 1 |
| 20. | State random number table? | | CO6 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the role of statistics in agricultural experiments. | | CO1 | U | 5 |
| 22. | Illustrate bar diagram. | | CO1 | A | 5 |
| 23. | Calculate the mean, median, and mode for a given dataset.  45, 50, 55, 60, 65, 55, 70, 50, 60, 55 | | CO2 | A | 5 |
| 24. | Explain different measures of dispersion with examples. | | CO2 | U | 5 |
| 25. | State addition theorem of probability. | | CO3 | A | 5 |
| 26. | Distinguish between binomial and Poisson distributions. | | CO3 | U | 5 |
| 27. | Explain the steps involved in computing correlation. | | CO4 | U | 5 |
| 28. | Illustrate the regression equations for X and Y. | | CO4 | A | 5 |
| 29. | Explain the concept of one-sample t-test. | | CO5 | U | 5 |
| 30. | Explain the procedure of Chi-square test for independence. | | CO5 | U | 5 |
| 31. | Write short notes on F-test and its uses. | | CO6 | U | 5 |
| 32. | Describe the procedure for selecting a simple random sample. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. |  | Explain the importance of central tendency and dispersion in interpreting agricultural data. | CO2 | U | 15 |
|  |  |  |  |  |  |
| 34. |  | From the following data, compute Karl Pearson’s coefficient of correlation and interpret the result.   | **X (Fertilizer Used – kg/acre)** | **5** | **10** | **15** | **20** | **25** | **30** | | --- | --- | --- | --- | --- | --- | --- | | Y (Yield – quintals/acre) | 15 | 25 | 35 | 45 | 40 | 50 | | CO4 | A | 15 |
|  |  |  |  |  |  |
| 35. |  | Explain the types of sampling methods and the procedure for simple random sampling using lottery method | CO6 | U | 15 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 6 | 5 |  |  |  | 14 |
| **CO2** | 2 | 20 | 5 |  |  |  | 27 |
| **CO3** | 2 | 6 | 5 |  |  |  | 13 |
| **CO4** | 2 | 6 | 20 |  |  |  | 28 |
| **CO5** | 2 | 11 |  |  |  |  | 13 |
| **CO6** | 3 | 27 |  |  |  |  | 30 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define: Entrepreneurship? | | CO2 | U | 1 |
| 2. | Describe about business entrepreneur? | | CO3 | R | 1 |
| 3. | Categories the MSME classification of entrepreneurship? | | CO3 | U | 1 |
| 4. | Explain about Supervision? | | CO3 | R | 1 |
| 5. | Define: Leadership? | | CO3 | R | 1 |
| 6. | Examine the Total Quality Management (TQM)? | | CO4 | R | 1 |
| 7. | Interpret the Concurrent Control? | | CO4 | U | 1 |
| 8. | Describe about SWOT Analysis? | | CO5 | U | 1 |
| 9. | Examine the Market Segmentation? | | CO2 | R | 1 |
| 10. | Define: Agribusiness? | | CO1 | U | 1 |
| 11. | List out the objectives of financial management? | | CO2 | R | 1 |
| 12. | Elaborate the Supply Chain Management (SCM)? | | CO2 | U | 1 |
| 13. | Relate: Placement and Orientation? | | CO3 | R | 1 |
| 14. | Explain about Remuneration? | | CO1 | U | 1 |
| 15. | Describe about the objectives of the KVIC? | | CO2 | R | 1 |
| 16. | Interpret the Business communication? | | CO3 | U | 1 |
| 17. | Describe about the importance of entrepreneurs? | | CO3 | U | 1 |
| 18. | Examine the Human Resource Planning Process? | | CO2 | R | 1 |
| 19. | Describe about Job Description? | | CO5 | U | 1 |
| 20. | Explain about Start-up and Business incubators? | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Categories the Clarence Danhof & Aruthur H. Cole classifications of entrepreneurs? | | CO1 | R | 5 |
| 22. | Distinguish the different types of entrepreneurs? | | CO1 | R | 5 |
| 23. | Describe about SWOT Analysis & achievement motivation? | | CO5 | R | 5 |
| 24. | Generalize the steps in Entrepreneurial Development Process? | | CO1 | U | 5 |
| 25. | Interpret the steps involved in effective monitoring and evaluation? | | CO4 | R | 5 |
| 26. | Summarize the steps involved in effective supervising? | | CO3 | U | 5 |
| 27. | List out the types of business incubators? | | CO5 | R | 5 |
| 28. | Describe about the four steps involved in the controlling process? | | CO3 | R | 5 |
| 29. | Elaborate the problem-solving skills? | | CO4 | U | 5 |
| 30. | Describe about developing managerial skills? | | CO4 | R | 5 |
| 31. | Explain about the Total Quality Management (TQM)? | | CO5 | U | 5 |
| 32. | Identify the Opportunities for Agri-entrepreneurship & rural enterprise? | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Elaborate the characteristics of entrepreneurs? | CO1 | A | 7.5 |
|  | b. | Interpret the various government policy, and programs & institutions for entrepreneurship development? | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Describe the details of impact of economic reforms on Agribusiness/  Agri-enterprises? | CO4 | A | 7.5 |
|  | b. | Illustrate the steps involved business leadership skills? | CO3 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Summarize the steps in supply chain drivers & Importance of Supply chain Management? | CO5 | U | 7.5 |
|  | b. | Categories the steps involved in project planning formulation & report preparation? | CO6 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 10 | 7 | 7.5 | - | - | - | 24.5 |
| **CO2** | 4 | 9.5 | 5 | - | - | - | 18.5 |
| **CO3** | 9 | 16.5 | - | - | - | - | 25.5 |
| **CO4** | 11 | 6 | 7.5 | - | - | - | 24.5 |
| **CO5** | 10 | 14.5 | - | - | - | - | 24.5 |
| **CO6** | 7.5 | - | - | - | - | - | 7.5 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **23HO2277** | **Duration** | **3hrs** |
| **Course Title** | **MICROPROPAGATION TECHNOLOGIES** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define micropropagation. | | CO1 | U | 1 |
| 2. | Name the scientist who first coined the term ‘totipotency’. | | CO1 | R | 1 |
| 3. | Write one application of tissue culture in horticulture | | CO1 | U | 1 |
| 4. | Define sterilization. | | CO2 | R | 1 |
| 5. | Mention the components of MS media. | | CO2 | R | 1 |
| 6. | Mention one disadvantage of tissue culture. | | CO2 | U | 1 |
| 7. | Name one synthetic growth regulator used in tissue culture. | | CO3 | R | 1 |
| 8. | What is dedifferentiation? | | CO3 | U | 1 |
| 9. | Mention the first stage in micropropagation. | | CO3 | R | 1 |
| 10. | Write an example of organogenesis. | | CO4 | U | 1 |
| 11. | Mention one advantage of somatic embryogenesis. | | CO4 | U | 1 |
| 12. | Define somaclonal variation. | | CO4 | R | 1 |
| 13. | Give one application of somaclonal variation. | | CO5 | U | 1 |
| 14. | Define synthetic seed. | | CO5 | U | 1 |
| 15. | Mention one example of cell suspension culture product. | | CO6 | U | 1 |
| 16. | What is cryopreservation? | | CO6 | R | 1 |
| 17. | What do you know about cell suspension culture? | | CO6 | U | 1 |
| 18. | Define callus. | | CO1 | R | 1 |
| 19. | List out the role of plant growth regulators in tissue culture. | | CO2 | U | 1 |
| 20. | Name one method of hardening plantlets. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the historical milestones in plant tissue culture. | | CO1 | A | 5 |
| 22. | Describe the concept of totipotency with suitable examples. | | CO2 | U | 5 |
| 23. | List the applications of tissue culture in crop improvement. | | CO3 | A | 5 |
| 24. | Define micropropagation and explain its stages. | | CO4 | U | 5 |
| 25. | Explain synthetic seed production process. | | CO5 | A | 5 |
| 26. | Discuss the applications of cryopreservation. | | CO6 | A | 5 |
| 27. | Briefly explain the importance of micropropagation in disease management. | | CO1 | U | 5 |
| 28. | Write short notes on synthetic medium and its components. | | CO2 | A | 5 |
| 29. | Discuss the methodology of sterilization techniques in detail. | | CO3 | A | 5 |
| 30. | Explain shoot tip and meristem culture and its advantages. | | CO4 | A | 5 |
| 31. | Write short notes on direct somatic embryogenesis. | | CO5 | A | 5 |
| 32. | Explain the contribution of cryopreservation in crop improvement | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the achievements and future prospects of micropropagation. | CO1 | E | 7.5 |
|  | b. | Discuss in detail organ culture and its significance. | CO1 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain in detail the methodology of tissue culture. | CO2 | An | 7.5 |
|  | b. | Discuss in detail the advantages and disadvantages of tissue culture. | CO2 | E | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain in detail the process of somatic embryogenesis and its applications. | CO3 | E | 7.5 |
|  | b. | Discuss in detail about cryopreservation and its significance | CO3 | C | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the history, milestones, and basic concepts of micropropagation and tissue culture. |
| **CO2** | Apply knowledge of totipotency, dedifferentiation, and regeneration in tissue culture. |
| **CO3** | Analyse applications, methodology, and media components used in tissue culture. |
| **CO4** | Evaluate micropropagation pathways, organogenesis and Embyogenesis techniques. |
| **CO5** | Understand achievements, prospects, embryoculture, synthetic seeds and somaclonal variation. |
| **CO6** | Apply cryopreservation techniquess and cell suspension culture for metabolite production. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 7 | 2 | 5 | 8 | 7 |  | 29 |
| **CO2** | 2 | 7 | 5 | 8 | 7 |  | 29 |
| **CO3** | 2 | 1 | 10 |  | 8 | 7 | 28 |
| **CO4** | 2 | 7 | 5 |  |  |  | 14 |
| **CO5** |  | 2 | 10 |  |  |  | 12 |
| **CO6** | 1 | 2 | 5 | 5 |  |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3001** | **Duration** | **3hrs** |
| **Course Title** | **MODERN CONCEPTS IN CROP PRODUCTION** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Illustrate Leaf Area Index | | CO1 | U | 1 |
| 2. | Define lodging. | | CO2 | R | 1 |
| 3. | Define remote sensing. | | CO6 | U | 1 |
| 4. | What is crop modeling? | | CO2 | R | 1 |
| 5. | Define available water. | | CO3 | U | 1 |
| 6. | What is evapotranspiration? | | CO4 | R | 1 |
| 7. | Which is the best complementary enterprise with crop?  a) Livestock b) Poultry c)Fish d) Bees | | CO5 | R | 1 |
| 8. | What is crop ideotype? | | CO1 | R | 1 |
| 9. | Define plant population. | | CO1 | U | 1 |
| 10. | What is minimum tillage? | | CO6 | R | 1 |
| 11. | What is hydroponics? | | CO6 | R | 1 |
| 12. | Define production function. | | CO2 | U | 1 |
| 13. | Which chemical accumulates during drought condition? | | CO4 | R | 1 |
| 14. | Define cropping system. | | CO5 | U | 1 |
| 15. | What is evasion? | | CO4 | R | 1 |
| 16. | The nutrient concentration range in which added nutrient will not increase yield but can increase nutrient concentration is referred as--------- | | CO3 | R | 1 |
| 17. | List out process-based crop models. | | CO6 | R | 1 |
| 18. | The instrument which is used for sowing of seed with fertilizer together at a time is\_\_\_\_\_\_\_\_\_\_ | | CO3 | R | 1 |
| 19. | Write the application of GIS in agriculture. | | CO6 | R | 1 |
| 20. | Define Infiltration | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe Mitscherlich yield equation and its interpretation. | | CO4 | U | 5 |
| 22. | Analyze Baule unit and its applicability | | CO1 | An | 5 |
| 23. | Describe the concept of organic farming along with its objectives. | | CO5 | U | 5 |
| 24. | Explain Net Assimilation Rate, Crop Growth Rate and Leaf Area Duration along with their formulae. | | CO1 | U | 5 |
| 25. | Explain different types of biofertilizers and their roles in organic farming. | | CO5 | U | 5 |
| 26. | Define Integrated Nutrient Management. Explain various components of INM. | | CO3 | U | 5 |
| 27. | Define Inverse yield nitrogen law. Write short note on it. | | CO1 | An | 5 |
| 28. | Discuss about SPAC (SOIL PLANT WATER CONTINUM) | | CO3 | U | 5 |
| 29. | Explain the factor affecting crop production and yield. | | CO2 | U | 5 |
| 30. | Define IFS. Discuss its components in brief. | | CO5 | U | 5 |
| 31. | Explain the roles of different abiotic factors in plant growth and development | | CO4 | U | 5 |
| 32. | Explain drought stress and its physiological effects and crop adaptation mechanisms. | | CO4 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Classify different agro climatic zones according to Planning Commission of India giving the details of area. | CO1 | U | 8 |
|  | b. | Classify crop response curves related to yield of plant. Discuss them along with diagram. | CO1 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | Explain the effects of lodging on yield and quality of crop. Express measurements of lodging. | CO2 | U | 8 |
|  | b. | Explain the role of growth hormones. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Compare conservation and zero tillage. Briefly discuss types of tillage. | CO6 | U | 7 |
|  | b. | Define Precision agriculture. Explain the concepts, tools and field applications. | CO6 | U | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the crop production techniques and crop growth in relation to environment |
| **CO2** | Address various factors affecting crop production and yield |
| **CO3** | Apprehend the effective ways of soil and nutrient management |
| **CO4** | Recommend effective ways to overcome the environmental stresses affecting crop growth and yield |
| **CO5** | Optimize effective utilization of farm resources, diversification of crop productions and maximizing the farm income |
| **CO6** | Apply 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 Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 15 | - | 10 | 7 | - | 33 |
| **CO2** | 2 | 14 | - | - | - | - | 16 |
| **CO3** | 2 | 12 | - | - | - | - | 14 |
| **CO4** | 3 | 22 | - | - | - | - | 25 |
| **CO5** | 1 | 16 | - | - | - | - | 17 |
| **CO6** | 4 | 16 | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3002** | **Duration** | **3hrs** |
| **Course Title** | **PRINCIPLES AND PRACTICES OF SOIL FERTILITY AND NUTRIENT MANAGEMENT** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define sustainable agriculture. | | CO1 | U | 1 |
| 2. | State the deficiency symptoms of nitrogen in plants. | | CO1 | R | 1 |
| 3. | What is tillage? | | CO1 | R | 1 |
| 4. | State the Bray’s Nutrient Mobility Concept. | | CO2 | R | 1 |
| 5. | Expand FCO. | | CO2 | U | 1 |
| 6. | List out the essential elements needed for plant growth. | | CO2 | E | 1 |
| 7. | Mention the role of Sulfur in plants? | | CO3 | R | 1 |
| 8. | What is the deficiency symptom of “Yellow spot of citrus”? | | CO3 | U | 1 |
| 9. | What is FYM? | | CO3 | R | 1 |
| 10. | Define Biofertilizers? | | CO4 | An | 1 |
| 11. | Write the general characteristics of the fertilizers? | | CO4 | A | 1 |
| 12. | What is WUE? | | CO4 | R | 1 |
| 13. | Cite the Soil Test Crop Response (STCR) Approach. | | CO5 | A | 1 |
| 14. | State about Integrated nutrient management. | | CO5 | R | 1 |
| 15. | What is Blanket recommendation? | | CO6 | U | 1 |
| 16. | Formula to calculate Nutrient requirement (NR) in kg/ quintal of the produce? | | CO6 | U | 1 |
| 17. | What is Fertigation? | | CO6 | R | 1 |
| 18. | What is Straight fertilizer and give an example. | | CO1 | R | 1 |
| 19. | What are Micronutrients and give one example. | | CO2 | R | 1 |
| 20. | List out the forms of solid fertilizers. | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate ‘soil fertility’ from ‘soil productivity’. | | CO1 | R | 5 |
| 22. | Write the classification of essential elements? | | CO4 | U | 5 |
| 23. | Write the role of potassium in plant growth and developments. | | CO2 | R | 5 |
| 24. | What are characterization of organic farming in relation to soil fertility and crop production? | | CO3 | U | 5 |
| 25. | Write short notes on Vermicompost. | | CO5 | U | 5 |
| 26. | Write the Classification of fertilizer with example? | | CO6 | An | 5 |
| 27. | Describe the deficiency symptoms on old leaves? | | CO1 | R | 5 |
| 28. | Discuss about different types of fertilizer application? | | CO2 | E | 5 |
| 29. | Write shorts notes on nitrogenous fertilizers? | | CO2 | U | 5 |
| 30. | Write about how to improve the natural fertility states of the soil? | | CO4 | R | 5 |
| 31. | Explain the importance of farmyard manure? | | CO3 | R | 5 |
| 32. | Write short notes on Features of a good soil management. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write down the plant nutrients and explain the role/functions of plant nutrients. | CO1 | U | 10 |
|  | b. | Write the factors influencing methods of application. | CO1 | R | 5 |
|  |  |  |  |  |  |
| 34. | a. | Write an essay on Integrated Nutrient Management. | CO2 | U | 10 |
|  | b. | Explain the process involved in the transformation of Phosphorous in soil. | CO2 | R | 5 |
|  |  |  |  |  |  |
| 35. | a. | Write the detail of different types of fertilizer recommendation approaches. | CO3 | An | 10 |
|  | b. | Explain the performance of Blue Green Algae with plants. | CO2 | R | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Comprehend the concepts of soil fertility and plant nutrition. |
| **CO2** | Evaluate the soil nutrient status and plant nutrient content. |
| **CO3** | Conceptualize the soil nutrient dynamics and plant uptake. |
| **CO4** | Appreciate the importance of manures and fertilizers in crop production. |
| **CO5** | Suggest nutrient recommendation based on soil fertility. |
| **CO6** | Workout the economics of fertilizer use. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 18 | 11 | - | - | - | - | 29 |
| **CO2** | 12 | 16 | - | - | 6 | - | 34 |
| **CO3** | 12 | 6 | - | 10 | - | - | 28 |
| **CO4** | 6 | 6 | 1 | 1 | - | - | 14 |
| **CO5** | 1 | 5 | 1 | - | - | - | 7 |
| **CO6** | 6 | 2 | - | 5 | - | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3006** | **Duration** | **3hrs** |
| **Course Title** | **CROPPING SYSTEMS AND SUSTAINABLE AGRICULTURE** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Cropping systems. | | CO1 | R | 1 |
| 2. | Define ‘soil fertility’ | | CO3 | U | 1 |
| 3. | What do you mean by relay intercropping? | | CO2 | U | 1 |
| 4. | What do you remember about Allelopathy. | | CO5 | R | 1 |
| 5. | Define fertilizer use efficiency. | | CO4 | R | 1 |
| 6. | State Monoculture cropping. | | CO4 | U | 1 |
| 7. | Define Tillage. | | CO2 | R | 1 |
| 8. | Write down patch cropping. | | CO5 | U | 1 |
| 9. | What do you remember about crop diversification | | CO2 | R | 1 |
| 10. | Write short note on dry land farming. | | CO6 | U | 1 |
| 11. | Write about cropping pattern | | CO6 | R | 1 |
| 12. | State ‘farming systems’. | | CO5 | U | 1 |
| 13. | Define companion crop. | | CO2 | R | 1 |
| 14. | Define the guard crop. | | CO1 | R | 1 |
| 15. | What do you mean by ratooning? | | CO1 | U | 1 |
| 16. | Write about crop rotation. | | CO1 | U | 1 |
| 17. | Define multiple cropping. | | CO3 | R | 1 |
| 18. | State annidation in cropping system. | | CO3 | U | 1 |
| 19. | Define multi-tire cropping. | | CO6 | U | 1 |
| 20. | How would you define synergetic cropping? | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out the importance of cropping pattern | | CO5 | U | 5 |
| 22. | Describe about scope and concepts of farming systems | | CO6 | R | 5 |
| 23. | Write a short note on LEISA and listout the principle of LEISA | | CO4 | A | 5 |
| 24. | List out the significant impact on sustainable agriculture | | CO2 | U | 5 |
| 25. | Compare between the advantages and disadvantage of mixed cropping | | CO2 | R | 5 |
| 26. | Discuss about characteristics of integrated farming systems | | CO3 | A | 5 |
| 27. | Write in details about characteristics of good intercropping systems | | CO2 | U | 5 |
| 28. | Describe about the choice of crops in organic farming. | | CO5 | R | 5 |
| 29. | Discuss about the advantages and disadvantages of alley cropping and its types | | CO5 | U | 5 |
| 30. | List out the physical resources, soil and water management in cropping system | | CO1 | R | 5 |
| 31. | Explain the role of manures in soil fertility management with suitable examples | | CO4 | U | 5 |
| 32. | Brief about mixed cropping and its classification, advantage and disadvantage | | CO1 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about the classification and benefits of cropping systems. | CO1 | U | 7.5 |
|  | b. | Describe about the commercial application of plant growth regulators in agriculture. | CO5 | R | 7.5 |
| 34. | a. | Write in details about the mechanism of yield advantage in cropping systems. | CO6 | U | 7.5 |
|  | b. | Explain how to manage the agronomic measures for reducing requirement of labour and inputs on Low and no cost technologies. | CO3 | A | 7.5 |
| 35. | a. | Define farming systems. Briefly explain about the scope, importance and components of farming systems. | CO5 | U | 7.5 |
|  | b. | Narrate the Site-specific development of IFS model for different agro-climatic zones. | CO6 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **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** | Evaluate sustainable agriculture with conventional agriculture in a scientific manner. |
| **CO5** | Optimize crop diversification and the sustainability of farm operations. |
| **CO6** | Recommend sustainable crop production for guiding farmers. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 7 | 14.5 | - | - | - | - | 21.5 |
| **CO2** | 8 | 11 | - | - | - | - | 19 |
| **CO3** | 1 | 2 | 12.5 | - | - | - | 15.5 |
| **CO4** | 1 | 6 | 5 | - | - | - | 12 |
| **CO5** | 14.5 | 19.5 | - | - | - | - | 34 |
| **CO6** | 6 | 9.5 | 7.5 | - | - | - | 23 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3008** | **Duration** | **3hrs** |
| **Course Title** | **AGRONOMY OF MAJOR CEREALS AND PULSES** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Name two important rice varieties grown in Tamil Nadu. | | CO1 | U | 1 |
| 2. | State the critical stages of irrigation in rice. | | CO1 | U | 1 |
| 3. | List two leading states producing pigeonpea in India. | | CO1 | R | 1 |
| 4. | State the critical stages of irrigation in sorghum. | | CO2 | R | 1 |
| 5. | Mention the spacing recommended for blackgram cultivation. | | CO2 | A | 1 |
| 6. | Define the term ‘tillering’ in cereals. | | CO2 | R | 1 |
| 7. | Mention the spacing recommended for maize cultivation. | | CO3 | U | 1 |
| 8. | Define the term ‘physiological maturity’ in crops. | | CO3 | R | 1 |
| 9. | Define the term Puddling | | CO3 | U | 1 |
| 10. | Name any two dwarf rice varieties. | | CO4 | R | 1 |
| 11. | State the critical stages of irrigation in wheat. | | CO4 | U | 1 |
| 12. | When does the Samba Rice season starts | | CO4 | R | 1 |
| 13. | State two constraints in pulse production in India. | | CO5 | U | 1 |
| 14. | Give one resistant variety of chickpea for wilt disease. | | CO5 | A | 1 |
| 15. | Define Rabi cereals with two examples. | | CO6 | U | 1 |
| 16. | Define kharif cereals and give two examples. | | CO6 | R | 1 |
| 17. | What is harvest index? | | CO6 | U | 1 |
| 18. | List the major nutrient requirements of maize. | | CO1 | R | 1 |
| 19. | What are the climatic requirements for sorghum cultivation? | | CO2 | U | 1 |
| 20. | State two important pulses grown during the rabi season. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the origin and distribution of wheat in India. | | CO1 | A | 5 |
| 22. | Describe the classification of maize | | CO2 | U | 5 |
| 23. | Write short notes on water management in rice. | | CO3 | An | 5 |
| 24. | Explain the intercultural operations followed in sorghum. | | CO4 | E | 5 |
| 25. | Discuss the field preparation and sowing techniques of greengram. | | CO5 | A | 5 |
| 26. | Discuss the post-harvest handling and processing of cereals. | | CO6 | E | 5 |
| 27. | Explain any five growth indices used for field crops. | | CO1 | E | 5 |
| 28. | Write short notes on pest and disease management in pigeonpea. | | CO2 | R | 5 |
| 29. | Write short notes on importance and scopes of pulses production in India | | CO3 | R | 5 |
| 30. | Describe the classification of wheat species | | CO4 | U | 5 |
| 31. | Discuss the steps involved in seed production of maize. | | CO5 | U | 5 |
| 32. | Write short notes on weed and nutrient management of rice | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the complete package of practices for rice cultivation in Tamil Nadu. | CO1 | R | 7.5 |
|  | b. | Explain the climatic and soil factors influencing rice yield. | CO1 | A | 7.5 |
|  |  |  |  | U |  |
| 34. | a. | Discuss the crop management practices for wheat from sowing to harvest. | CO2 | R | 7.5 |
|  | b. | Explain the agronomic practices of maize and sorghum in kharif season. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the crop management practices of rabi and kharif pulses | CO3 | A | 7.5 |
|  | b. | Discuss the importance of varietal selection and irrigation scheduling. | CO3 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 2 | 5 | 5 | 15 |  | 29 |
| **CO2** | 2 | 2 | 5 | 5 | 15 |  | 29 |
| **CO3** | 1 | 2 | 5 | 5 | 15 |  | 28 |
| **CO4** | 2 | 2 | 5 | 5 |  |  | 14 |
| **CO5** | 1 | 1 | 5 | 5 |  |  | 12 |
| **CO6** | 2 | 1 | 5 | 5 |  |  | 13 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3009** | **Duration** | **3hrs** |
| **Course Title** | **AGRONOMY OF OILSEED, FIBER AND SUGAR CROPS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | In growth analysis, \_\_\_\_\_\_\_\_\_\_\_is a measure of a plant's photosynthetic efficiency. | | CO1 | U | 1 |
| 2. | Rapeseed and Mustard require coarse seedbed preparation for sowing. (True/ False) | | CO1 | C | 1 |
| 3. | Presence of \_\_\_\_\_\_\_\_\_\_\_\_ protects the mustard oil from rancidity. | | CO2 | A | 1 |
| 4. | Linseed is globally cultivated for its fiber and is called as \_\_\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 5. | The seed rate of hybrids of sunflower is lower than varieties. (True/False). | | CO3 | E | 1 |
| 6. | Under limited moisture, the two most critical stages of irrigation in groundnut are \_\_\_\_\_\_\_\_\_\_\_\_ and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** | | CO3 | C | 1 |
| 7. | State the botanical name for Niger | | CO3 | U | 1 |
| 8. | Name the state in India which is the major producer of Ramie. | | CO4 | R | 1 |
| 9. | The sugarbeet top contains growth stimulant is \_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | A | 1 |
| 10. | Nitrogen requirement of planted cane is more than ratoon crop. (True / False) | | CO5 | An | 1 |
| 11. | In India, one bale of cotton typically weighs \_\_\_\_\_\_\_\_\_\_\_ kilo grams. | | CO4 | E | 1 |
| 12. | Jute is sensitive to drought and waterlogging. (True/ False). | | CO4 | C | 1 |
| 13. | Why safflower harvesting be suggested in the morning hours? | | CO5 | U | 1 |
| 14. | Tying the canes by using the lower bottom leaves is called \_\_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 15. | Define: Juice Brix | | CO6 | A | 1 |
| 16. | How much is the protein content in soybean? | | CO6 | An | 1 |
| 17. | What is Harvest Index? | | CO1 | U | 1 |
| 18. | Define: Aflatoxin | | CO1 | E | 1 |
| 19. | The sesamum is originated in \_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | A | 1 |
| 20. | The optimum seed rate for Irrigated Castor is \_\_\_\_\_\_\_\_\_\_ | | CO3 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe different methods of sowing Sugarcane along with their merits and demerits. | | CO1 | An | 5 |
| 22. | Why is thinning and gap filling important in the crop of Sugar beet? Describe manurial requirement and irrigation management in it? | | CO5 | U | 5 |
| 23. | How orabanche affect in Sunflower and Indian mustard, explain its severity under different soil types and describes its control measures? | | CO2 | A | 5 |
| 24. | Give the fertilizer, irrigation and weed management practices of Sesamum? | | CO3 | U | 5 |
| 25. | Name the important weeds associated with the crop of Cotton and give their cultural and chemical control? | | CO6 | C | 5 |
| 26. | Suggest the suitable soil and climatic requirements for attaining optimum yield in Ramie and Mesta cultivation in India? | | CO4 | An | 5 |
| 27. | Write the importance of safflower crop and their potential uses? | | CO6 | E | 5 |
| 28. | Explain the congenial environment requirement of linseed crop for potential yield in terms of climate, soil requirement, fertilizer and irrigation application. | | CO2 | R | 5 |
| 29. | Soybean is protein rich oil seed crop considering that describes its fertilizer requirement? | | CO3 | U | 5 |
| 30. | Explain the role of crop geometry and seed rate in groundnut cultivation. | | CO1 | U | 5 |
| 31. | Describe the soil and climatic requirement of Niger with optimum sowing time during different seasons in India? | | CO2 | A | 5 |
| 32. | Why is the nutrient requirement of *Corchorus capsularis* more than *Corchorus olitorius* despite same productivity level of improved varieties of both species? Give the dose and time of application of fertilizer of Jute crop. | | CO4 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Irrigation and fertilizers have synergistic interaction on yield of Rapeseed and Indian mustard. Explain the recommended dose of fertilizer and critical stage of Irrigation application for rainfed and irrigated condition. | CO2 | C | 7.5 |
|  | b. | Why is the seed rate of Rainfed and Irrigated Castor different? Give the optimum seed rate and spacing with fertilizer requirement for both growing conditions. | CO3 | E | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain the harvesting time and method of harvesting for Jute along with process of retting? | CO4 | U | 7.5 |
|  | b. | State about the genetically modified crops. Discuss in detail about the Bt cotton success in India along with its merits and demerits. | CO6 | An | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Why is ratoon crop recommended in Sugarcane? Describe different improved management practices of ratoon crop. How are these differences between planted crops and why? | CO1 | R | 7.5 |
|  | b. | Explain the harvesting process of Sugar beet in terms of time, method, removal of leaf crown and storage of roots. | CO5 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 7.5 | 7 | - | 5 | 1 | 1 | 21.5 |
| **CO2** | 5 | - | 11 | - | - | 7.5 | 23.5 |
| **CO3** | - | 11 | 1 | 1 | 8.5 | 1 | 22.5 |
| **CO4** | 1 | 7.5 | 1 | 11 | 1 | 1 | 22.5 |
| **CO5** | 1 | 6 | 7.5 | - | - | - | 14.5 |
| **CO6** | 1 | - | 1 | 8.5 | 5 | 5 | 20.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3016** | **Duration** | **3hrs** |
| **Course Title** | **RECENT TRENDS IN CROP GROWTH AND PRODUCTIVITY** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Expand NAR with a formula. | | CO6 | R | 1 |
| 2. | Growth hormones act as -------. | | CO4 | R | 1 |
| 3. | Cytokinins were first discovered in -------. | | CO4 | R | 1 |
| 4. | The formula for Heat Unit (Growing Degree Days) is -------. | | CO3 | R | 1 |
| 5. | Competition functions are used to measure ------. | | CO3 | R | 1 |
| 6. | Theater for photosynthesis is ------. | | CO2 | R | 1 |
| 7. | In the asymptotic curve, yield increases with density until -------. | | CO3 | R | 1 |
| 8. | The first commercial herbicide resistant crop was ------- | | CO5 | R | 1 |
| 9. | List two major constraints of irrigated areas. | | CO5 | R | 1 |
| 10. | Define Water Use Efficiency. | | CO5 | R | 1 |
| 11. | List any two stages of growth in a typical crop growth curve. | | CO1 | R | 1 |
| 12. | Define chemosynthesis. | | CO3 | R | 1 |
| 13. | Describe Solar Constant. | | CO2 | U | 1 |
| 14. | Define multi-tire cropping with examples. | | CO1 | R | 1 |
| 15. | Define PRA. | | CO1 | R | 1 |
| 16. | List the components of the watershed programme. | | CO1 | R | 1 |
| 17. | Define AGR with a formula. | | CO6 | R | 1 |
| 18. | List the Environmental factors affecting growth. | | CO2 | R | 1 |
| 19. | List any two factors affecting the interception of solar radiation. | | CO1 | R | 1 |
| 20. | Define Ideotype. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the concept of Crop Growth Rate (CGR) and Relative Growth Rate (RGR) formulas. | | CO6 | An | 5 |
| 22. | Enlist and elaborate on the major constraints in dryland farming and suggest remedial measures. | | CO3 | A | 5 |
| 23. | Describe the concept of Water Use Efficiency (WUE) and the factors influencing it. | | CO3 | U | 5 |
| 24. | Describe the genetic and environmental factors influencing optimum plant density. | | CO1 | U | 5 |
| 25. | Explain the principles governing efficient intercropping under rainfed and irrigated conditions. | | CO2 | An | 5 |
| 26. | Explain the adaptive mechanisms of dryland crops to drought conditions. | | CO2 | An | 5 |
| 27. | Explain the significance of indices like LER, IER, and Aggressively Index in assessing competition. | | CO6 | A | 5 |
| 28. | Explain the chloroplast is known as the theater for photosynthesis. | | CO2 | U | 5 |
| 29. | Write a short note on Crop geometry. | | CO1 | A | 5 |
| 30. | Discuss the advantages and limitations of transgenic herbicide resistant crops. | | CO5 | An | 5 |
| 31. | Explain in detail about factors essential for photosynthesis. | | CO1 | An | 5 |
| 32. | Define transgenic crops and explain their significance in modern agriculture. | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Differentiate between intercropping and mixed cropping systems with suitable examples and describe the criteria used to assess yield advantage in intercropping. | CO2 | A | 7.5 |
|  | b. | Explain in details about the management of intercropping system. | CO1 | E | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Write a short note on the criteria for assessing the yield advantages. | CO3 | An | 7.5 |
|  | b. | Explain the desirable characteristics of rice and maize ideotypes. | CO4 | E | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Write a detailed note on transgenic crops. | CO5 | A | 7.5 |
|  | b. | Classify plant growth hormones and explain their general roles. | CO5 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Apply the strategies for maximizing solar energy utilization for crop growth and productivity. |
| **CO2** | Acquire knowledge on physiological principles impacting crop growth and productivity. |
| **CO3** | Evaluate the physiological parameters of crop analysis for interpreting the crop growth and development. |
| **CO4** | Compare the principals involved in different cropping systems for assessing the yield advantages. |
| **CO5** | Utilize competitive relationship and competition functions among plants for agronomic production. |
| **CO6** | Adopt the concept of plant ideotypes and growth promotors for field crop production. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 5 | 5 | 5 | 5 | 7.5 | - | 27.5 |
| **CO2** | 2 | 6 | 7.5 | 10 | - | - | 25.5 |
| **CO3** | 4 | 5 | 5 | 7.5 | - | - | 21.5 |
| **CO4** | 3 | - | - | - | 7.5 | - | 10.5 |
| **CO5** | 3 | 12.5 | 7.5 | 5 | - | - | 28.0 |
| **CO6** | 2 | - | 5 | 5 | - | - | 12 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3018** | **Duration** | **3hrs** |
| **Course Title** | **RECENT TRENDS IN WEED MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The herbicide that inhibits photosynthetic electron transport is classified under …………. | | CO3 | U | 1 |
| 2. | State the type of dormancy that was caused by the genetic background of the species. | | CO2 | R | 1 |
| 3. | Prolonged use of the same herbicide group results in …………. | | CO3 | U | 1 |
| 4. | The weed …………. that is most useful for reclaiming alkaline soils. | | CO1 | R | 1 |
| 5. | List any two major weed flora found in rice and maize ecosystems. | | CO1 | R | 1 |
| 6. | The process of trapping solar radiation using plastic sheets on moist soil to heat the upper layer is known as …………. | | CO2 | U | 1 |
| 7. | List the type of herbicide capable of translocating from treated to untreated plant parts based on molecular nature. | | CO3 | R | 1 |
| 8. | Write the propagation organ responsible for the persistence of Cyperus rotundus and Cynodon dactylon. | | CO2 | A | 1 |
| 9. | The wind borne dispersal through a papery balloon like structure is seen in …………. Type of weeds. | | CO2 | U | 1 |
| 10. | Write any two benefits of integrated weed management. | | CO5 | A | 1 |
| 11. | Define precision weed management. | | CO5 | R | 1 |
| 12. | Give one example each of contact and systemic herbicides. | | CO3 | U | 1 |
| 13. | State any two advanced weed detection technologies. | | CO5 | R | 1 |
| 14. | Distinguish between cross resistance and multiple resistance. | | CO4 | U | 1 |
| 15. | Herbicide 2,4-D belongs to the …………. group. | | CO3 | R | 1 |
| 16. | List any two transgenic crops developed for weed management. | | CO5 | R | 1 |
| 17. | Rainfall immediately after herbicide spray primarily affects the process of …………. | | CO4 | An | 1 |
| 18. | The toxic chemical secreted by one species that inhibits its own kind is termed as…………. | | CO3 | U | 1 |
| 19. | Give any two advantages of site specific weed management. | | CO4 | U | 1 |
| 20. | Define herbicide compatibility. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss the ecological importance and life cycle of major weed groups. | | CO1 | U | 5 |
| 22. | Explain the biological mechanisms of weed competition in crops. | | CO2 | A | 5 |
| 23. | Analyze the causes and consequences of herbicide resistance in weeds. | | CO3 | An | 5 |
| 24. | Write a brief note on invasive weeds in India and their management options. | | CO2 | A | 5 |
| 25. | Classify herbicides based on any five criteria and write their characteristics. | | CO4 | U | 5 |
| 26. | Describe the use of drones and sensors in precision weed management. | | CO5 | U | 5 |
| 27. | Explain the role of biotechnology in developing herbicide-tolerant crops. | | CO5 | A | 5 |
| 28. | Assess the importance of herbicide residue monitoring in environmental safety. | | CO6 | E | 5 |
| 29. | Enumerate the factors influencing weed seed dormancy and germination. | | CO2 | R | 5 |
| 30. | Explain the crop weed interactions with reference to allelopathy. | | CO2 | A | 5 |
| 31. | Evaluate the advantages and constraints of integrated weed management. | | CO5 | E | 5 |
| 32. | Discuss the ecological factors influencing weed succession in crop ecosystems. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the concept of weed dynamics and its ecological balance in a cropping system. | CO2 | A | 7.5 |
|  | b. | Analyze the interaction of the weed population under climate change scenarios. | CO1 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Describe the advanced herbicide application technologies used in modern agriculture. | CO3 | U | 7.5 |
|  | b. | Evaluate the compatibility of different herbicides with plant growth regulators. | CO4 | E | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the role of molecular and biotechnological tools in weed management. | CO5 | U | 7.5 |
|  | b. | Evaluate the significance of bioassay techniques in detecting herbicide residues. | CO6 | E | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify the different types of weeds and their ecosystem. |
| **CO2** | Understand the weed biology. |
| **CO3** | Apply the knowledge about herbicides and their effects on modern crop production. |
| **CO4** | Compute the compatibility of different herbicide groups and with different agrochemicals. |
| **CO5** | Recommend the advanced biotechnological tools and concepts in weed management. |
| **CO6** | Evaluate various bioassay and other herbicide residue assessment techniques. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 5 | - | 7.5 | - | - | 14.5 |
| **CO2** | 6 | 7 | 23.5 | - | - | - | 36.5 |
| **CO3** | 2 | 11.5 | - | 5 | - | - | 18.5 |
| **CO4** | 1 | 7 | - | 1 | 7.5 | - | 16.5 |
| **CO5** | 3 | 12.5 | 6 | - | 5 | - | 26.5 |
| **CO6** | - | - | - | - | 12.5 | - | 12.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3022** | **Duration** | **3hrs** |
| **Course Title** | **RESEARCH AND PUBLICATION ETHICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define philosophy. Name the main branches of philosophy. | | CO1 | R | 1 |
| 2. | List the branch called as the “queen of science”. | | CO1 | R | 1 |
| 3. | Describe epistemology. | | CO2 | U | 1 |
| 4. | Define ethics. | | CO2 | R | 1 |
| 5. | Define moral judgment. | | CO2 | U | 1 |
| 6. | List the cardinal sins of research. | | CO3 | U | 1 |
| 7. | Define research integrity. | | CO2 | R | 1 |
| 8. | Describe plagiarism. | | CO4 | U | 1 |
| 9. | Explain salami slicing in publication. | | CO4 | U | 1 |
| 10. | Give an example of redundant publication. | | CO4 | An | 1 |
| 11. | Expand COPE. | | CO5 | A | 1 |
| 12. | Define Scopus. | | CO5 | R | 1 |
| 13. | Define conflict of interest in publication ethics. | | CO5 | R | 1 |
| 14. | List a few predatory journals. | | CO4 | An | 1 |
| 15. | Define open access publishing. | | CO5 | U | 1 |
| 16. | Define journal finder. | | CO6 | U | 1 |
| 17. | Name one plagiarism detection software. | | CO4 | A | 1 |
| 18. | Describe h-index. | | CO6 | U | 1 |
| 19. | Expand WAME. | | CO6 | A | 1 |
| 20. | Define data aggregation. | | CO6 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the nature and scope of philosophy. | | CO1 | A | 5 |
| 22. | Describe the different types of peer-reviewed journals. | | CO3 | U | 5 |
| 23. | Examine how a software tool used by the SPPU center is helping to identify predatory publications. | | CO4 | A | 5 |
| 24. | Explain with suitable examples on how to calculate the Impact Factor. | | CO4 | U | 5 |
| 25. | Recall Indexing Database and list the names of the Indexing databases used in research. | | CO6 | R | 5 |
| 26. | Recite the significance of intellectual honesty in research. | | CO2 | R | 5 |
| 27. | Discuss the importance of publication ethics in scientific writing. | | CO3 | U | 5 |
| 28. | Describe the roles of COPE and WAME in maintaining publication standards. | | CO6 | U | 5 |
| 29. | List the different journal suggestion tools. | | CO5 | R | 5 |
| 30. | Enumerate the functions and importance of SHERPA/RoMEO in open-access publishing. | | CO5 | R | 5 |
| 31. | Write a note on Turnitin and its features. | | CO4 | A | 5 |
| 32. | Write short notes on citation metrics — h-index, i10-index, and g-index. | | CO6 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define philosophy, its nature, scope, and major branches with examples. | CO1 | R | 7 |
|  | b. | Write notes on   1. Web of Science 2. Impact Factor 3. SNIP 4. SJR 5. CABI | CO2 | A | 8 |
|  |  | **OR** |  |  |  |
| 34. | a. | Explain the concept of open access publishing. | CO5 | An | 7 |
|  | b. | Describe about Anti-plagiarism tool and write a basic step to detect plagiarism. | CO4 | R | 8 |
|  |  | **OR** |  |  |  |
| 35. | a. | Define plagiarism and the common types of plagiarism. | CO3 | A | 8 |
|  | b. | Appraise the global initiatives- SHERPA, RoMEO, JANE, Elsevier Finder, Springer Suggester, and their relevance in modern research. | CO5 | E | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Follow the ethical principles and philosophical foundations of research. |
| **CO2** | Demonstrate intellectual integrity and uphold research honesty. |
| **CO3** | Address scientific misconduct and eliminate redundant publications. |
| **CO4** | Recognize publication malpractice, predatory publishers, and unscrupulous journals. |
| **CO5** | Acquainted with open access publishing and related initiatives. |
| **CO6** | Compare databases such as indexing databases, citation databases, and metrics like h-index, g-index, i10-index, and altmetrics. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 9 | - | 5 | - | - | - | 14 |
| **CO2** | 7 | 2 | 8 | - | - | - | 17 |
| **CO3** | - | 11 | 8 | - | - | - | 19 |
| **CO4** | 8 | 7 | 11 | 2 | - | - | 28 |
| **CO5** | 12 | 1 | 1 | 7 | 7 | - | 28 |
| **CO6** | 5 | 8 | 6 | - | - | - | 19 |
|  |  |  |  |  |  |  | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3024** | **Duration** | **3hrs** |
| **Course Title** | **PHYSIOLOGICAL AND MOLECULAR ASPECTS OF SOURCE-SINK CAPACITY FOR ENHANCING YIELD LOGISTICS MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
|  | **PART-A(20X1=20 MARKS)** | | | | |
| 1. | State an example for source-sink dynamics. | | CO1 | R | 1 |
| 2. | Define phosphorescence. | | CO2 | R | 1 |
| 3. | Define LHC. | | CO4 | R | 1 |
| 4. | Define canopy architecture. | | CO2 | R | 1 |
| 5. | List the features of dorsiventral and isobilateral leaf | | CO4 | U | 1 |
| 6. | Define light interception and light saturation | | CO1 | R | 1 |
| 7. | State and example for photoautotroph. | | CO3 | A | 1 |
| 8. | List the two traits for C4 engineering in plants | | CO5 | R | 1 |
| 9. | Name the key genes are involved in regulating source and sink activities in plants. | | CO3 | U | 1 |
| 10. | Draw the structure of LAI -2200C plant canopy analyzer | | CO2 | U | 1 |
| 11. | List the components of ETC to optimize source-sink balance. | | CO5 | U | 1 |
| 12. | Explain the function of CRISPR/Cas systems. | | CO3 | An | 1 |
| 13. | Explain NAR. | | CO1 | U | 1 |
| 14. | Name one key difference between C3 and C4 plant leaves. | | CO4 | R | 1 |
| 15. | Explain the difference between source and sink | | CO1 | U | 1 |
| 16. | Name the component involved in the primary role of photosynthesis | | CO4 | R | 1 |
| 17. | Select two genes involved in light use efficiency | | CO4 | U | 1 |
| 18. | Explain the importance of shade avoidance response (SAR). | | CO3 | An | 1 |
| 19. | Define QTL. | | CO5 | U | 1 |
| 20. | Explain the function of bicarbonate transportors and aquaporins | | CO2 | U | 1 |
|  | **PART B(10 X 5= 50 MARKS)**  **(Answer any 10 from the following)** | | | | |
| 21. | Explain the concepts and application of chloroplast engineering in crops | | CO3 | An | 5 |
| 22. | Summarize the concepts of SGC for carbon gain in plants. | | CO4 | U | 5 |
| 23. | Explain the engineering of C4 cycle and its traits with a suitable diagram | | CO5 | An | 5 |
| 24. | Describe the concepts of leaf mesophyll tissue thickness (SLW) in photosynthesis | | CO3 | U | 5 |
| 25. | Discuss the role of GDD and phenology in determining crop yield. | | CO6 | U | 5 |
| 26. | Elaborate the relationship between source-sink dynamics and canopy photosynthesis with a suitable diagram | | CO1 | An | 5 |
| 27. | Describe the crop improvement strategies for higher yield and enhancing sink size with a suitable example | | CO6 | U | 5 |
| 28. | Describe concepts of shade avoidance response (SAR) with a suitable  diagram | | CO3 | A | 5 |
| 29. | Explain the difference between dorsiventral and isobilateral leaf with suitable diagram | | CO4 | U | 5 |
| 30. | Explain the significance of transcriptomics and functional genomics for sink strength in plants. | | CO5 | An | 5 |
| 31. | Explain the photorespiratory synthetic bypass concepts for source capacity in plants. | | CO4 | An | 5 |
| 32. | Discuss the role of canopy architecture to support sink requirements in pulses | | CO2 | U | 5 |
|  | **PART C(2 X 15= 30 MARKS)**  **(Answer any 2 from the following)** | | | | |
| 33. | a. | Explain the CRISPR-based genome editing techniques in improving photosynthetic traits for enhanced crop productivity | CO3 | U | 8 |
| b. | Describe the role of plant density,leaf orientation and canopy architecture in light interception and source strength in plants | CO1 | U | 7 |
| 34. | a. | Explain the role of hormones in regulating molecular mechanisms of yield. | CO2 | An | 8 |
| b. | Describe the relationship between leaf anatomy and stomatal regulation in different crops for enhancing carbon fixation and yield. | CO4 | R | 7 |
| 35. | a. | Examine the genomic and genetic resources for developing tillering associated traits, branching patterns/fruiting points and spikelet number | CO5 | A | 8 |
| b. | Evaluate the strategies for engineering seed/fruit size and its impact on yield enhancement | CO6 | E | 7 |

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|  | **COURSE OUTCOMES** |
| CO1 | Apply the principle of light interception to enhance source establishment for enhancing yield in plants. |
| CO2 | Examine the canopy size, water and nutrient status for improving photosynthesis for source establishment in plants. |
| CO3 | Analyze the emerging photosynthetic engineering tools to improve the source function for enhanced yield. |
| CO4 | Compare the leaf and stomatal physiology in different crops to improve the carbon fixation for higher yields in crops. |
| CO5 | Adopt the genetic and genomic resources to identify potential trait for enhanced source capacity. |
| CO6 | Evaluate the different characters in relation to sink size for enhanced yield in crops. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / BL | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 2 | 9 | - | 5 | - | - | 16 |
| CO2 | 2 | 7 | - | 8 | - | - | 17 |
| CO3 | - | 14 | 6 | 7 | - | - | 27 |
| CO4 | 10 | 12 | - | 5 | - | - | 27 |
| CO5 | 1 | 2 | 8 | 10 | - | - | 21 |
| CO6 | - | 10 | - | - | 7 | - | 17 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3025** | **Duration** | **3hrs** |
| **Course Title** | **PRINCIPLES OF GENETICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Genetics | | CO1 | U | 1 |
| 2. | Define karyotype. | | CO1 | U | 1 |
| 3. | Define backcross | | CO1 | U | 1 |
| 4. | Explain Translation. | | CO2 | R | 1 |
| 5. | Define Central dogma. | | CO2 | R | 1 |
| 6. | What is Autosome. | | CO2 | U | 1 |
| 7. | Define Multiple alleles. | | CO3 | U | 1 |
| 8. | What is Homozygous? | | CO3 | U | 1 |
| 9. | Define Idegogram. | | CO3 | R | 1 |
| 10. | Define Heredity | | CO4 | R | 1 |
| 11. | Expand DNA and RNA | | CO4 | R | 1 |
| 12. | Classify the Mutagen. | | CO4 | R | 1 |
| 13. | Define law of segregation. | | CO5 | U | 1 |
| 14. | Define mitotic/ meiotic phase. | | CO5 | R | 1 |
| 15. | Define cytoplasmic inheritance | | CO6 | U | 1 |
| 16. | What is pseudo genes | | CO6 | R | 1 |
| 17. | Define multiple alleles with examples | | CO6 | U | 1 |
| 18. | Define Hardy – Weinberg equilibrium | | CO1 | U | 1 |
| 19. | What is cell organelles? | | CO2 | R | 1 |
| 20. | Define law of independent assortment | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the Special types of chromosomes | | CO1 | R | 5 |
| 22. | Explain the Pre mendelian ideas about heredity ( any five ideas) | | CO2 | R | 5 |
| 23. | Define crossing over and its types. | | CO3 | U | 5 |
| 24. | Define RNA and its Classifications | | CO4 | U | 5 |
| 25. | Discuss the  Chromosome Structure | | CO5 | U | 5 |
| 26. | Explain in detail about the Mendel’s Law with example | | CO6 | R | 5 |
| 27. | Define multiple alleles? Explain in detail about fur color in rabbits for multiple allelic series. | | CO1 | U | 5 |
| 28. | Describe the various stages of mitotic/ meiotic phase. | | CO2 | U | 5 |
| 29. | Differentiate coupling and repulsion phases of linkage | | CO3 | An | 5 |
| 30. | Difference between sex linked, sex influenced and sex limited inheritance | | CO4 | An | 5 |
| 31. | What is transformation? Give a brief discuss about Griffith experiment. | | CO5 | U | 5 |
| 32. | What is sex determination in plants? Explain with Melandrium, papaya and maize | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the meiosis and write different stages. | CO1 | R | 8 |
|  | b. | Explain the three laws of inheritance proposed by Mendel with suitable example. | CO2 | R | 7 |
|  |  |  |  |  |  |
| 34. | a. | What is crossing over? Write about the factors affecting crossing over and mention its significance. | CO3 | U | 8 |
|  | b. | Define mutation. Briefly describe the kinds of Mutation. | CO4 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | What is translation? Describe the mechanism of translation in prokaryotes/eukaryotes. | CO5 | U | 8 |
|  | b. | Explain about Watson and Crick model of DNA double helical structure and its types. | CO2 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Demonstrate a comprehensive understanding of genetic inheritance principles. |
| **CO2** | Apply molecular techniques for genetic analysis. |
| **CO3** | Interpret genetic data using statistical methods. |
| **CO4** | Acquire the advanced techniques in gene isolation, synthesis and cloning. |
| **CO5** | Analyze the concept of gene silencing, DNA restriction and sequencing techniques. |
| **CO6** | Examine the polymorphisms in DNA and proteins. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 13 | 9 |  |  |  |  | 22 |
| **CO2** | 22 | 6 |  |  |  |  | 28 |
| **CO3** | 1 | 15 |  | 5 |  |  | 21 |
| **CO4** | 3 | 13 |  | 5 |  |  | 21 |
| **CO5** | 1 | 19 |  |  |  |  | 20 |
| **CO6** | 6 | 7 |  |  |  |  | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3026** | **Duration** | **3hrs** |
| **Course Title** | **PRINCIPLES OF CYTOGENETICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Balbiani rings in polytene chromosomes | | CO1 | U | 1 |
| 2. | Mention any five genetic disorders. | | CO1 | R | 1 |
| 3. | Differentiate ‘euchromatin’ from ‘heterochromatin’ | | CO1 | U | 1 |
| 4. | What Doubled haploid? | | CO2 | R | 1 |
| 5. | State Cell theory | | CO2 | A | 1 |
| 6. | What is somatic reduction? | | CO2 | U | 1 |
| 7. | State about Alien addition. | | CO3 | A | 1 |
| 8. | What is chromosomal aberration and give an example. | | CO3 | U | 1 |
| 9. | Classifications of chimeras. | | CO3 | A | 1 |
| 10. | Define Protoplast fusion. | | CO4 | U | 1 |
| 11. | Explain Man-made Cereals. | | CO4 | U | 1 |
| 12. | Define Karyotype. | | CO4 | R | 1 |
| 13. | Define Chromosome. | | CO5 | R | 1 |
| 14. | Define endomitosis. | | CO5 | R | 1 |
| 15. | Define Monosomy. | | CO6 | R | 1 |
| 16. | Explain translocation with an example. | | CO6 | U | 1 |
| 17. | Define Apomixis | | CO6 | R | 1 |
| 18. | Where is found chromosome in cells? | | CO1 | A | 1 |
| 19. | Define wide hybridization. | | CO2 | R | 1 |
| 20. | What is Gene Mapping? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe in detail about the chromosomal banding technique. | | CO1 | A | 5 |
| 22. | Write a short note on mitotic cell cycle with a neat sketch. | | CO2 | U | 5 |
| 23. | Write a short note on structure changes of chromosomes. | | CO3 | R | 5 |
| 24. | Define euploidy? Give an account of various types of euploidy? | | CO4 | R | 5 |
| 25. | Discuss the genetic consequences of aneuploidy. | | CO5 | A | 5 |
| 26. | Briefly explain Chromosome Manipulation In Distant Hybridization | | CO6 | U | 5 |
| 27. | Discuss briefly the Special types of chromosomes. | | CO1 | U | 5 |
| 28. | Explain the Diploidization of haploid plants. | | CO2 | A | 5 |
| 29. | Classification of polyploidy. | | CO3 | U | 5 |
| 30. | Explain the Classification of lethal alleles. | | CO4 | U | 5 |
| 31. | Describe the higher order organization of chromosome structure. | | CO5 | R | 5 |
| 32. | Discuss the chromosome painting. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write in detail about the meiotic cell cycle with a neat schematic representation. | CO1 | A | 7.5 |
|  | b. | Write in detail about the structure and importance of chromosomes with neat schematic representation. |  | R | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss Numerical chromosomal aberration? | CO2 | U | 7.5 |
|  | b. | Give an account of three-point testcross method of gene mapping? |  | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the barriers to the production of ‘Distant Hybrids’. | CO3 | U | 7.5 |
|  | b. | Briefly discuss about the Production and use of haploids, dihaploids and doubled haploids in genetics and breeding. |  | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Analyze chromosome structures in various organisms for functional insights. |
| **CO2** | Demonstrate proficiency in cytogenetic techniques for chromosomal manipulation |
| **CO3** | Apply chromosomal knowledge in advanced crop improvement strategies |
| **CO4** | Evaluate chromosomal variations' evolutionary significance in breeding. |
| **CO5** | Utilize chromosome mapping for practical genome applications |
| **CO6** | Apply di-haploids, and double haploids for gene fixation in breeding programs. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 8.5 | 7 | 13.5 | - | - | - | 29 |
| **CO2** | 2 | 13.5 | 13.5 | - | - | - | 29 |
| **CO3** | 12.5 | 13.5 | 2 | - | - | - | 28 |
| **CO4** | 6 | 8 |  | - | - | - | 14 |
| **CO5** | 7 | - | 5 | - | - | - | 12 |
| **CO6** | 2 | 11 | - | - | - | - | 13 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3027** | **Duration** | **3hrs** |
| **Course Title** | **PRINCIPLES OF PLANT BREEDING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Write any two objectives of plant breeding with example. | | CO1 | U | 1 |
| 2. | Define Plant introduction | | CO1 | R | 1 |
| 3. | State the law of parallel variation. | | CO1 | R | 1 |
| 4. | What do you know about combining ability and mention their types? | | CO2 | U | 1 |
| 5. | Define heritability. | | CO2 | R | 1 |
| 6. | Write about genotype environment interaction. | | CO2 | U | 1 |
| 7. | What is transgressive segregation? | | CO3 | U | 1 |
| 8. | Define pure line theory. | | CO3 | R | 1 |
| 9. | What do you know about diallel selective mating? | | CO3 | U | 1 |
| 10. | Give the definition of a notified variety and its significance. | | CO4 | U | 1 |
| 11. | What do you mean by ideotype breeding in crop improvement programs? | | CO4 | U | 1 |
| 12. | What is male sterility in plants? Mention its types. | | CO4 | R | 1 |
| 13. | Outline the concept of wide hybridization in crop breeding. | | CO5 | An | 1 |
| 14. | Define clonal selection. | | CO5 | R | 1 |
| 15. | List out the applications of mutation breeding in crop improvement. | | CO6 | A | 1 |
| 16. | Give an account of Participatory Plant Breeding in modern plant breeding programs. | | CO6 | A | 1 |
| 17. | Write the differences between vertical and horizontal resistance. | | CO6 | U | 1 |
| 18. | List out the various components of plant genetic resources. | | CO1 | R | 1 |
| 19. | Define gene action and mention its types. | | CO2 | R | 1 |
| 20. | What do you understand by the Ear-to-Row selection method? | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Discuss Agro-biodiversity and its significance. | | CO1 | A | 5 |
| 22. | Explain the various components of variation. | | CO2 | U | 5 |
| 23. | Give detailed procedure of pedigree breeding. | | CO3 | A | 5 |
| 24. | Elaborate on the steps involved in the variety release procedure. | | CO4 | A | 5 |
| 25. | Explain the concept and process of heterosis breeding in detail. | | CO5 | U | 5 |
| 26. | Explain how MAS integrates molecular markers into conventional breeding techniques. | | CO6 | A | 5 |
| 27. | Briefly explain the role of plant genetic resources in plant breeding. | | CO1 | U | 5 |
| 28. | Discuss in detail about General and specific combining ability. | | CO2 | U | 5 |
| 29. | Write the differences between pure line and mass selection. | | CO3 | An | 5 |
| 30. | Describe the procedure of recurrent selection. | | CO4 | U | 5 |
| 31. | Explain the commercial exploitation of self-incompatibility in crop plants. | | CO5 | A | 5 |
| 32. | Discuss the regulations related to plant breeders’ rights, plant variety protection, and farmers’ rights. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain in detail about the objectives and accomplishments of plant breeding. | CO1 | U | 7.5 |
|  | b. | Discuss the centres of origin in detail. | CO1 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain genetic basis of breeding in self and cross-pollinated crops. | CO2 | E | 7.5 |
|  | b. | Describe the types of gene action and their implications in breeding. | Co2 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | How will you transfer a dominant resistance gene through backcross breeding? | CO3 | E | 7.5 |
|  | b. | Give detailed description on multiline breeding. | CO3 | A | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the importance of plant breeding to develop new varieties by utilizing appropriate breeding methods and techniques |
| **CO2** | Adopt the appropriate method of hybridization programs to improve the genetic gain of the crop |
| **CO3** | Identify and evaluate the best combiners for variety and hybrid development |
| **CO4** | Attain skills in maintenance breeding materials and varietal release procedures |
| **CO5** | Apply special breeding techniques to develop pre-breeding material for genetic enhancement |
| **CO6** | Acquire knowledge of participatory plant breeding and plant variety protection |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 14 | 5 | 7 | 0 | 0 | 29 |
| **CO2** | 2 | 12 | 7 | 0 | 8 | 0 | 29 |
| **CO3** | 1 | 2 | 12 | 5 | 8 | 0 | 28 |
| **CO4** | 1 | 8 | 5 | 0 | 0 | 0 | 14 |
| **CO5** | 1 | 5 | 5 | 1 | 0 | 0 | 12 |
| **CO6** | 0 | 6 | 7 | 0 | 0 | 0 | 13 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG3031** | **Duration** | **3hrs** |
| **Course Title** | **BREEDING FOR QUALITY AND SPECIAL TRAITS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | State the storage form of carbohydrate in plants. | | CO3 | R | 1 |
| 2. | Cite the vitamin which is enriched in Golden Rice. | | CO1 | U | 1 |
| 3. | Name one Indian aromatic rice variety. | | CO1 | R | 1 |
| 4. | Cite the amino acids which are enriched in QPM. | | CO1 | U | 1 |
| 5. | Define biofortification. | | CO5 | R | 1 |
| 6. | Define genetic engineering. | | CO5 | R | 1 |
| 7. | Identify the trait “stay-green” is associated in which group of crops. | | CO1 | U | 1 |
| 8. | Define anti-nutritional factor. | | CO3 | R | 1 |
| 9. | Which trait is targeted in cotton for quality improvement? | | CO1 | R | 1 |
| 10. | What are second-generation transgenics. | | CO4 | U | 1 |
| 11. | Define RIL in Mapping population. | | CO6 | R | 1 |
| 12. | List the sulfur-containing amino acids. | | CO4 | R | 1 |
| 13. | State the example for anti-nutritional factor in groundnut. | | CO3 | R | 1 |
| 14. | The quality of wheat for making bread is determined by-------------- | | CO2 | R | 1 |
| 15. | The term "Nutritional Genomics" refers to the study of------------------- | | CO5 | U | 1 |
| 16. | PUFA stands for -------------------- | | CO3 | R | 1 |
| 17. | 1. Sugarcane Breeding Institute (SBI) is situated at-------------- 2. Which country first issued a biosafety permit for commercial cultivation of Golden Rice? | | CO1 | R | 1 |
| 18. | Compare the ‘edible significance’ with ‘industrial significance’ of erucic acid available in mustard oil. | | CO2 | U | 1 |
| 19. | The term "GMO" stands for-------------- | | CO4 | R | 1 |
| 20. | Brix % is one of the quality parameters for which crop? State its family, chromosome number, and scientific name. | | CO1 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Write a short note on Golden Rice and its nutritional benefit. | | CO4 | R | 5 |
| 22. | Explain the significance of biofortification and give examples of biofortified crops. | | CO2 | U | 5 |
| 23. | Explain the breeding strategies for enhancing quality traits in pearl millet. | | CO2 | U | 5 |
| 24. | What is MAS (Marker-Assisted Selection) and its role in quality improvement? | | CO6 | A | 5 |
| 25. | Explain the concept of specialty corns. | | CO1 | R | 5 |
| 26. | Write about quality improvement in pulses. | | CO3 | An | 5 |
| 27. | Analyze the key steps involved in a typical genetic engineering protocol. | | CO5 | An | 5 |
| 28. | Write a short note on second generation transgenics. | | CO4 | U | 5 |
| 29. | Discuss the approaches used to improve quality traits in groundnut through breeding. | | CO3 | A | 5 |
| 30. | List the commonly used Breeding strategies for quality improvement in crops and explain any two of them. | | CO2 | U | 5 |
| 31. | Explain the molecular strategies used to manipulate oil crops to increase PUFA content. | | CO5 | U | 5 |
| 32. | Explain the genetic manipulation for quality improvement in cotton . | | CO3 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define quality traits and explain its classification. | CO1 | R | 7 |
|  | b. | Write a short note on Quality Protein Maize (QPM). | CO2 | U | 8 |
|  |  |  |  |  |  |
| 34. | a. | Describe the developmental biochemistry of carbohydrates in plants. | CO3 | R | 7 |
|  | b. | Explain the breeding approaches for improved oil quality. | CO2 | A | 8 |
|  |  |  |  |  |  |
| 35. | a. | Explain the concept of biofortification and its Classification. | CO5 | R | 7 |
|  | b. | Explain the factors determining baking quality in wheat. | CO3 | U | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | |  | | --- | | Acquire an insight in recent advances in improvement of quality traits. | |
| **CO2** | |  | | --- | | Assess the breeding methods to increase the physiological efficiency of crops. | |
| **CO3** | |  | | --- | | Apply their knowledge on developmental biochemistry of carbohydrate and Proteins. | |
| **CO4** | |  | | --- | | Develop GMOs with improved quality. | |
| **CO5** | |  | | --- | | Recognize the genetic engineering tools for quality improvement. | |
| **CO6** | |  | | --- | | Evaluate the mapping populations using MAS procedures. | |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 16 | 3 |  |  |  |  | 19 |
| **CO2** | 1 | 24 | 8 |  |  |  | 33 |
| **CO3** | 11 | 8 | 10 | 5 |  |  | 34 |
| **CO4** | 7 | 6 |  |  |  |  | 13 |
| **CO5** | 9 | 6 |  | 5 |  |  | 20 |
| **CO6** | 1 |  | 5 |  |  |  | 6 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3032** | **Duration** | **3hrs** |
| **Course Title** | **MUTAGENESIS AND MUTATION BREEDING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Forward mutation. | | CO1 | U | 1 |
| 2. | Explain cytoplasmic mutation. | | CO1 | R | 1 |
| 3. | Define antimutator gene. | | CO1 | U | 1 |
| 4. | Define ‘Muton’ | | CO2 | R | 1 |
| 5. | What is mean by Transversion. | | CO2 | U | 1 |
| 6. | Explain Frameshift mutation. | | CO2 | A | 1 |
| 7. | What is mean by Missence mutation. | | CO3 | U | 1 |
| 8. | Explain Alkylating agent. | | CO3 | A | 1 |
| 9. | What is mean by Tautomerization. | | CO3 | R | 1 |
| 10. | What is mean by Germinal mutation. | | CO4 | R | 1 |
| 11. | Explain Chimaeras. | | CO4 | U | 1 |
| 12. | What is mean by Non sense mutation. | | CO4 | A | 1 |
| 13. | What is mean by Base analogues? | | CO5 | R | 1 |
| 14. | Define Hot spots. | | CO5 | A | 1 |
| 15. | What is mean by Induced mutation? | | CO6 | U | 1 |
| 16. | Define ionizing radiation. | | CO6 | U | 1 |
| 17. | Explain Beta rays. | | CO6 | R | 1 |
| 18. | What is mean by point mutation? | | CO1 | A | 1 |
| 19. | Explain LD 50 dosage. | | CO2 | AN | 1 |
| 20. | What is mean by chronic exposure | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define mutagen and explain the chemical mutagen. | | CO1 | A | 5 |
| 22. | Write the short notes on spontaneous mutation. | | CO2 | U | 5 |
| 23. | List out the characteristic of Mutation. | | CO3 | A | 5 |
| 24. | Explain the effect of mutation on survival. | | CO4 | U | 5 |
| 25. | Explain the procedure for irradiation. | | CO5 | A | 5 |
| 26. | What are the factors affecting Radiation effects. | | CO6 | AN | 5 |
| 27. | Explain the dose of the mutagen. | | CO1 | E | 5 |
| 28. | Differentiate macro and micro mutation. | | CO2 | C | 5 |
| 29. | Explain the limitation of mutation breeding. | | CO3 | R | 5 |
| 30. | Describe some of the techniques for detection of mutation in drosophila. | | CO4 | R | 5 |
| 31. | What is mean by Azide. | | CO5 | R | 5 |
| 32. | Describe the achievement of mutation breeding. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the applications of mutation breeding in crop improvement. | CO1 | U | 7 |
|  | b. | Explain the molecular basis of mutation. | CO2 | R | 8 |
|  |  |  |  |  |  |
| 34. | a. | Outline a generalized procedure for mutation breeding with special reference to oligogenic characters. | CO2 | R | 8 |
|  | b. | Explain the mechanism action of radiation. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the procedure for mutation breeding and briefly explain the various methodologies. | CO3 | AN | 8 |
|  | b. | Explain about the Gamma Garden. | CO3 | E | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Estimate the dose concentration for acquiring the desired mutants. |
| **CO2** | Evaluate the effect of mutations on improving qualitative and quantitative traits. |
| **CO3** | Adopt various methods of mutations inducing variations in crop plants |
| **CO4** | Investigate the segregating mutant population in various crop plants to identify the elite mutant segregants. |
| **CO5** | Implement various selection procedures for trait improvement and trait mapping |
| **CO6** | Apply the advanced mutational breeding approaches involving TILLING, allele mining and genomics. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 9 | 6 | - | 5 | - | 21 |
| **CO2** | 17 | 6 | 1 | 1 | - | 5 | 30 |
| **CO3** | 6 | 8 | 6 | 8 | 7 | - | 35 |
| **CO4** | 7 | 6 | 1 | - | - | - | 14 |
| **CO5** | 6 |  | 6 | - | - | - | 12 |
| **CO6** | 1 | 7 | - | 5 | - | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3214** | **Duration** | **3hrs** |
| **Course Title** | **PLANT BIOCHEMISTRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define the site of Photosynthesis. | | CO1 | R | 1 |
| 2. | In which cell the light reaction occurs? | | CO1 | U | 1 |
| 3. | List out the pigment absorbs red and blue light in photosynthesis? | | CO1 | R | 1 |
| 4. | Write the primary CO**2** acceptor in C4 plants. | | CO2 | C | 1 |
| 5. | Where does CAM photosynthesis occur in the plants? | | CO2 | C | 1 |
| 6. | What is the primary phase stable product of C3 cycle? | | CO2 | An | 1 |
| 7. | List out the disaccharide sugar is produced in which part of the cell. | | CO3 | R | 1 |
| 8. | Outline the most abundant storage protein present in legumes. | | CO3 | U | 1 |
| 9. | Which is the main element use for nitrogen fixation? | | CO3 | A | 1 |
| 10. | Explain the storage form of carbohydrate in plants. | | CO4 | E | 1 |
| 11. | Which hormone regulates seed germination? | | CO4 | U | 1 |
| 12. | What is the phytohormone is responsible for cell elongation? | | CO4 | An | 1 |
| 13. | List out the imino acids which has the property of biotic and abiotic stress in plants. | | CO5 | R | 1 |
| 14. | What is the secondary metabolite releases HCN on hydrolysis? | | CO5 | C | 1 |
| 15. | Which amino acid is the main carrier of reduced nitrogen in plants? | | CO6 | A | 1 |
| 16. | Justify the gas form from phytohormone and its role. | | CO6 | C | 1 |
| 17. | State the primary enzyme involved in biological nitrogen fixation. | | CO6 | R | 1 |
| 18. | Name the hormone regulates seed germination and dormancy. | | CO1 | U | 1 |
| 19. | Which enzyme degrades cell wall during fruit ripening? | | CO2 | U | 1 |
| 20. | Explain the signaling molecule helps activate plant defense genes during stress? | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define Light reaction and write their role of light in photosynthesis. | | CO1 | U | 5 |
| 22. | Illustrate the chemistry of photosynthetic pigments. | | CO2 | A | 5 |
| 23. | Discuss in detail about biochemistry of seed germination. | | CO3 | E | 5 |
| 24. | Write a detail notes on stress adaptation role in phytohormone for growth and development. | | CO4 | C | 5 |
| 25. | Give a detailed account on Shikimate acid pathway, mechanism and role in plants. | | CO5 | An | 5 |
| 26. | Differentiate ‘abiotic stress’ from ‘biotic stress’ of plants. | | CO6 | An | 5 |
| 27. | Interpreting the C3, C4 and CAM metabolism of photosynthesis. | | CO1 | A | 5 |
| 28. | Write a short notes on sulphur metabolism. | | CO2 | R | 5 |
| 29. | Describe the stages of Seed germination, requirements and metabolism. | | CO3 | An | 5 |
| 30. | Define phytohormones and mode of action. | | CO4 | R | 5 |
| 31. | Explain the role of secondary metabolites in plants – terpenoids. | | CO5 | U | 5 |
| 32. | Explain in brief about the Cyanogenic glycosides. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Evaluate the Structure and chemistry of chlorophyll and other photosynthetic pigments. | CO1 | E | 7.5 |
|  | b. | Differentiate the ‘Electron transport chain’ from ‘ATP synthesis’ in light reactions. | CO2 | An | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Explain in detains about the Calvin cycle and CAM pathway of carbon fixation and its mechanism. | CO3 | U | 7.5 |
|  | b. | Execute the Sucrose-starch interconversion: Biochemical pathways and regulation. | CO4 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Describe the biosynthesis of structural carbohydrates, storage proteins, and lipids in plants. | CO5 | An | 7.5 |
|  | b. | Discuss about the biochemistry and significance of plant secondary metabolites. | CO6 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Analyse the mechanism of carbon fixation, synthesis of proteins and lipids for growth and development in plants. |
| **CO2** | Apply the knowledge of nutrient assimilation for growth and modulation of environmental stresses in plants. |
| **CO3** | Discuss the biochemical processes during seed germination and fruit ripening. |
| **CO4** | Analyse the role/ action of phytohormones for the growth development and in plant stress adaptations. |
| **CO5** | Apply the functions of secondary metabolites for plant adoption to biotic and environmental stress |
| **CO6** | Analyse the effects of abiotic and biotic stresses on plant growth and defense mechanisms. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 7 | 5 | - | 15 | - | 29 |
| **CO2** | 5 | 1 | 5 | 1 | - | 2 | 14 |
| **CO3** | 1 | 16 | 1 | 5 | 5 | - | 28 |
| **CO4** | 6 | 1 | - | 1 | 1 | 5 | 14 |
| **CO5** | 1 | 5 | 1 | 20 | - | 1 | 28 |
| **CO6** | 1 | 5 | 1 | 5 | - | - | 12 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3217** | **Duration** | **3hrs** |
| **Course Title** | **EXPERIMENTAL DESIGN** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | | **CO** | | **BL** | | **M** | |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | | | | | |
| 1. | Define design of experiment. | | | CO1 | | R | | 1 | |
| 2. | Explain the need for designing an experiment? | | | CO1 | | U | | 1 | |
| 3. | List any two characteristics of a good design. | | | CO1 | | R | | 1 | |
| 4. | List the three basic principles of experimental design? | | | CO1 | | R | | 1 | |
| 5. | Define randomization. | | | CO1 | | R | | 1 | |
| 6. | State replication? | | | CO1 | | U | | 1 | |
| 7. | Define local control. | | | CO1 | | R | | 1 | |
| 8. | Explain the purpose of a uniformity trial? | | | CO2 | | U | | 1 | |
| 9. | Write the meaning of plot in field experiments? | | | CO2 | | R | | 1 | |
| 10. | Define analysis of variance (ANOVA). | | | CO3 | | R | | 1 | |
| 11. | Define Completely Randomized Design (CRD)? | | | CO3 | | U | | 1 | |
| 12. | Define Randomized Block Design (RBD). | | | CO3 | | U | | 1 | |
| 13. | State Latin Square Design (LSD)? | | | CO3 | | R | | 1 | |
| 14. | Define factorial experiment. | | | CO4 | | R | | 1 | |
| 15. | Explain confounding? | | | CO4 | | U | | 1 | |
| 16. | Define split plot design. | | | CO4 | | R | | 1 | |
| 17. | Explain transformation in data analysis? | | | CO5 | | R | | 1 | |
| 18. | Define Balanced Incomplete Block Design (BIBD). | | | CO5 | | R | | 1 | |
| 19. | State alpha design? | | | CO5 | | U | | 1 | |
| 20. | Define response surface methodology. | | | CO6 | | U | | 1 | |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | | | | | |
| 21. | Explain the need and importance of designing agricultural experiments. | | | CO1 | | U | | 5 | |
| 22. | Discuss the characteristics of a good experimental design. | | | CO1 | | U | | 5 | |
| 23. | Describe the basic principles of randomization, replication, and local control. | | | CO1 | | A | | 5 | |
| 24. | Explain the concept of uniformity trials and how they help determine plot size. | | | CO2 | | A | | 5 | |
| 25. | Write short notes on analysis of variance (ANOVA) and its assumptions. | | | CO3 | | U | | 5 | |
| 26. | Differentiate between CRD, RBD, and LSD with examples. | | | CO3 | | A | | 5 | |
| 27. | Explain the concept of factorial experiments and their importance. | | | CO4 | | A | | 5 | |
| 28. | Write short notes on orthogonality and partitioning of degrees of freedom. | | | CO4 | | A | | 5 | |
| 29. | Explain the concept of confounding with a suitable example. | | | CO4 | | An | | 5 | |
| 30. | Describe the analysis of covariance (ANCOVA) and its applications. | | | CO5 | | A | | 5 | |
| 31. | Explain missing plot techniques used in RBD and LSD. | | | CO5 | | A | | 5 | |
| 32. | Write short notes on lattice and alpha designs. | | | CO5 | | U | | 5 | |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | | | | | |
| 33. |  | Explain the layout and analysis of Randomized Block Design (RBD) with suitable example. | CO3 | | U | | 15 | |
|  |  |  |  | |  | |  | |
| 34. |  | State factorial experiments and explain symmetrical and asymmetrical factorials with analysis. | CO4 | | R | | 15 | |
|  |  |  |  | |  | |  | |
| 35. |  | Describe the steps involved in the analysis and interpretation of results in alpha and lattice designs. | CO5 | | U | | 15 | |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the basic principles of design of experiments. |
| **CO2** | Apply the principles of designs while framing the field layouts. |
| **CO3** | Analyze and select optimum experimental design for their field research. |
| **CO4** | Collect the appropriate data from the experiment for the statistical analysis |
| **CO5** | Interpret the results of the statistical analysis with appropriate suggestions. |
| **CO6** | Remember the various applications of experimental designs. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 5 | 12 | 5 | - | - | - | 22 |
| **CO2** | 1 | 1 | 5 | - | - | - | 7 |
| **CO3** | 2 | 22 | 5 | - | - | - | 29 |
| **CO4** | 17 | 1 | 10 | 5 | - | - | 33 |
| **CO5** | 2 | 21 | 10 | - | - | - | 33 |
| **CO6** | - | 1 | - | - | - | - | 1 |
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**END SEMESTER EXAMINATION – NOV/DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG3228** | **Duration** | **3hrs** |
| **Course Title** | **PHYSIOLOGICAL AND MOLECULAR RESPONSES OF PLANTS TO ABIOTIC STRESSES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Which of the following is not an abiotic stress?  a) Salinity b) Pest c) Heat d) Drought | | CO1 | R | 1 |
| 2. | Which region in India is most frequently affected by droughts during the rainfed Kharif season?  a) Punjab b) Rajasthan c) Kerala d) West Bengal | | CO1 | A | 1 |
| 3. | Which of the following problems is commonly associated with coastal agricultural areas in India?  a) Water logging b) Heavy metal contamination c) Salinity d) Frost damage | | CO1 | R | 1 |
| 4. | During which phenological stage is a crop most sensitive to water stress \_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 5. | What do you mean by the term ‘Water mining’? | | CO2 | U | 1 |
| 6. | In drought-resistant plants, thicker wax layers help by \_\_\_\_\_\_\_\_ a) Enhancing photosynthesis b) Attracting pollinators c) Minimizing water loss d) Increasing stomatal density | | CO2 | U | 1 |
| 7. | What does Water Use Efficiency (WUE) refers to? | | CO3 | R | 1 |
| 8. | **Which of the following crop types generally has higher water use efficiency?** a) *Oryza sativa* b) *Triticum aestivum* c) *Saccharum officinarum* d) *Pennisetum glaucum* | | CO3 | R | 1 |
| 9. | What is the significance of identifying QTLs in crop breeding? | | CO3 | R | 1 |
| 10. | Difference between Glycophytes and Halophytes. | | CO4 | R | 1 |
| 11. | Mention any two primary effect of salt stress on plant growth. | | CO4 | R | 1 |
| 12. | Compartmentalization of salts in plant cells primarily occurs in \_\_\_\_\_\_\_. | | CO4 | R | 1 |
| 13. | Which plant hormone plays a key role in plant response to waterlogging? a) Auxin b) Gibberellin c) Ethylene d) Cytokinin | | CO5 | R | 1 |
| 14. | An adaptive trait in plants under prolonged waterlogging is  a) Deep root system b) Reduced ethylene production  c) Development of adventitious roots d) Increased cuticle thickness | | CO5 | U | 1 |
| 15. | The cereal crop which is considered more tolerant to water logging \_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 16. | The indicator plant for heavy metal toxicity is  a) Lichens b) *Robinia pseudoacacia* c) Chrysanthemumd) Gladiolus | | CO6 | R | 1 |
| 17. | Primary adaptive response of plants to high temperature is | | CO6 | U | 1 |
| 18. | Which hormone is primarily associated with thermotolerance in plants? | | CO1 | R | 1 |
| 19. | What is the primary role of Heat Shock Proteins (HSPs) in plants under stress?  a) Transport of water b) Protection and stabilization of proteins  c) Absorption of nutrients d) DNA replication | | CO2 | A | 1 |
| 20. | Shade Avoidance Response (SAR) is primarily triggered by a change in \_\_\_\_\_\_\_. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Define Anti - transpirants and elaborate its types with proper example. | | CO1 | U | 5 |
| 22. | Discuss how abiotic stresses act as major constraints in achieving potential crop yields. | | CO2 | R | 5 |
| 23. | Explain key biochemical changes that occur in plants under drought conditions. | | CO3 | U | 5 |
| 24. | Discuss any five adaptations that help plants survive physiological and biochemical changes during drought. | | CO4 | R | 5 |
| 25. | Explain drought avoidance mechanisms in plants with reference to maintenance of cell turgor and water mining by root characteristics. | | CO5 | A | 5 |
| 26. | Describe the various strategies plants use to cope with heat stress. | | CO6 | R | 5 |
| 27. | Describe species variation in salt tolerance and give examples of salt-tolerant and salt-sensitive plants. | | CO1 | A | 5 |
| 28. | Define trait introgression and explain its importance in crop improvement. | | CO2 | A | 5 |
| 29. | Describe different approaches used to improve salt tolerance in crop plants. | | CO3 | R | 5 |
| 30. | What are the physiological effects of cadmium (Cd) toxicity in plants and how do plants defend themselves against it? | | CO4 | U | 5 |
| 31. | Explain how ethylene helps plants in water logging condition. | | CO5 | U | 5 |
| 32. | Explain how plants adapt to low light conditions and describe the concept of Shade Avoidance Response (SAR). | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Define abiotic stress. Discuss briefly its importance and general characteristics. | CO1 | U | 7.5 |
|  | b. | Identify the different types of drought conditions and explain how it impacts plant growth and development | CO1 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | What are salt-affected soils? Provide a brief overview of their types and describe how saline soils can be managed. | CO2 | A | 7 |
|  | b. | Explain in detail the sources of salinity resistance and the breeding methods used to develop salt-tolerant plants | CO2 | A | 8 |
|  |  |  |  |  |  |
| 35. | a. | Discuss the effects of extreme temperatures (both high and low) on plant growth. Explain the adaptive mechanisms plants use to tolerate temperature stress. | CO3 | U | 9 |
|  | b. | Define photooxidation and photoinhibition. Explain their effects on plants and the tolerance mechanisms involved. | CO3 | U | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Examine the abiotic stresses affecting crop productivity and their interaction with biotic stresses |
| **CO2** | Analyse the physiological and biochemical changes that imparts abiotic stress tolerance in crops. |
| **CO3** | Investigate the regulatory mechanisms and key genes for abiotic stress tolerance in crop improvement programs. |
| **CO4** | Apply the genes/molecular mechanism that imparts abiotic stress tolerance for research and crop improvement |
| **CO5** | Develop genomic resources for molecular breeding to improve adaptive traits under stress |
| **CO6** | Compare the stress mechanisms at cellular and leaf level and their cross talk under various abiotic stresses |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 20 | 7 | - | - | - | 30 |
| **CO2** | 6 | 2 | 20 | - | - | - | 28 |
| **CO3** | 8 | 20 | - | - | - | - | 28 |
| **CO4** | 9 | 5 | - | - | - | - | 14 |
| **CO5** | 1 | 6 | 5 | - | - | - | 12 |
| **CO6** | 7 | 6 | - | - | - | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4025** | **Duration** | **3hrs** |
| **Course Title** | **CONCEPTS AND APPLICATION OF OMICS IN BIOLOGICAL SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Who developed the chain termination method of DNA sequencing? | | CO1 | R | 1 |
| 2. | Define functional genomics. | | CO2 | R | 1 |
| 3. | Explain comparative genomics study. | | CO2 | U | 1 |
| 4. | Expand SAGE and MPSS. | | CO1 | R | 1 |
| 5. | State the main objective of nutrigenomics. | | CO2 | U | 1 |
| 6. | Identify the instrument used in MALDI-TOF analysis. | | CO3 | U | 1 |
| 7. | Explain the purpose of quantitative PCR (qPCR) in genomics. | | CO3 | A | 1 |
| 8. | Illustrate how 2D-PAGE helps in protein separation. | | CO2 | A | 1 |
| 9. | Differentiate between MS-MS and MALDI-TOF in proteomics. | | CO2 | An | 1 |
| 10. | Why is LC-MS preferred for metabolite identification? | | CO4 | An | 1 |
| 11. | Compare automated sequencing and microarray analysis in terms of output data. | | CO3 | An | 1 |
| 12. | Interpret how gene annotation helps in identifying novel genes. | | CO5 | A | 1 |
| 13. | Suggest one bioinformatics tool useful for pairwise sequence alignment. | | CO3 | A | 1 |
| 14. | Justify the use of NMR in metabolomic profiling. | | CO4 | E | 1 |
| 15. | Evaluate the advantage of integrating genomics and proteomics in plant breeding. | | CO6 | E | 1 |
| 16. | Predict the impact of metabolic pathway engineering on improving plant yield. | | CO4 | C | 1 |
| 17. | Formulate a strategy to identify stress-related metabolites using LC-MS. | | CO4 | C | 1 |
| 18. | Assess the contribution of ionomics in nutrient-use efficiency studies. | | CO6 | E | 1 |
| 19. | Integrate functional genomics and transcriptomics approaches for studying drought tolerance. | | CO6 | C | 1 |
| 20. | Propose one example where multi-omics integration led to discovery of a novel gene or pathway. | | CO5 | C | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe the principle and steps involved in the chain termination method of DNA sequencing. | | CO5 | R | 5 |
| 22. | Explain the working principle of automated sequencing and its advantages over manual sequencing methods. | | CO3 | U | 5 |
| 23. | Illustrate the workflow of microarray technology and mention its major applications in genomics. | | CO2 | U | 5 |
| 24. | Apply the principle of quantitative PCR to quantify gene expression in a transgenic crop experiment. | | CO5 | A | 5 |
| 25. | Explain how 2D-PAGE and MALDI-TOF can be integrated for protein identification and analysis. | | CO2 | A | 5 |
| 26. | Analyze the differences between structural and functional proteomics with examples. | | CO2 | An | 5 |
| 27. | Compare SAGE, MPSS, and RNA-Seq as transcriptomics tools for gene expression profiling. | | CO1 | An | 5 |
| 28. | Examine the role of bioinformatics in functional genomics and gene annotation. | | CO1 | An | 5 |
| 29. | Evaluate how metabolomics contributes to understanding abiotic stress responses in plants. | | CO4 | E | 5 |
| 30. | Justify the importance of comparative genomics in evolutionary and crop improvement studies. | | CO3 | E | 5 |
| 31. | Design an experimental approach combining metabolomics and ionomics to study nutrient efficiency in cereals. | | CO6 | C | 5 |
| 32. | Propose an integrated multi-omics framework (genomics, proteomics, metabolomics) for developing stress-tolerant plants. | | CO6 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Compare and contrast the shotgun sequencing and clone-by-clone sequencing approaches. | CO1 | An | 8 |
|  | b. | Critically evaluate their significance in whole genome sequencing of complex plant species. | CO5 | E | 7 |
| 34. | a. | Evaluate the advantages and limitations of Next Generation Sequencing (NGS) platforms in crop improvement programs. | CO3 | An | 8 |
|  | b. | Analyze the workflow of proteomics research, integrating 2D-PAGE, MALDI-TOF, and MS/MS techniques. | CO2 | C | 7 |
| 35. | a. | Critically appraise the role of metabolomics and ionomics in understanding plant responses to biotic and abiotic stress. | CO6 | E | 8 |
|  | b. | Propose an experimental design using LC-MS, NMR, and FTIR for metabolite profiling in a biofortified cereal crop. | CO4 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Explore various sequencing techniques. |
| **CO2** | Describe comparative genomics and proteomics. |
| **CO3** | Compare methods for sequence alignments. |
| **CO4** | Apply advanced bioinformatic tools for elucidation of metabolic pathways. |
| **CO5** | Assess various kinds of RNA analysis. |
| **CO6** | Expertise in the field of integrated omics. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | - | - | 18 | - | - | 20 |
| **CO2** | 1 | 7 | 6 | 6 | - | 7 | 27 |
| **CO3** | - | 6 | 2 | 9 | 5 | - | 22 |
| **CO4** | - | - | - | 1 | 6 | 9 | 16 |
| **CO5** | 5 | - | 6 | - | 7 | 1 | 19 |
| **CO6** | - | - | - | - | 10 | 11 | 21 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4039** | **Duration** | **3hrs** |
| **Course Title** | **ADVANCES IN BIOMETRICAL GENETICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define ‘Selection response’. | | CO1 | R | 1 |
| 2. | List the two approaches in Diallel mating design. | | CO1 | R | 1 |
| 3. | Describe the criteria for selection of parents for Biparental approach. | | CO1 | U | 1 |
| 4. | Compare additive and dominance gene effect. | | CO2 | U | 1 |
| 5. | Enumerate the role ofnarrow sense heritability for selection. | | CO2 | U | 1 |
| 6. | Explain the role of GCA and SCA in selection. | | CO2 | U | 1 |
| 7. | Examine the role of foreground markers in MAS. | | CO3 | An | 1 |
| 8. | List the molecular markers used in marker-assisted selection. | | CO3 | R | 1 |
| 9. | List the software used in genome wide association studies . | | CO3 | R | 1 |
| 10. | State the number of linkage groups in maize. | | CO4 | R | 1 |
| 11. | Enumerate the role of morphological diversity of parents. | | CO4 | U | 1 |
| 12. | Explain the genetic principle involved in continuous variation. | | CO4 | U | 1 |
| 13. | Analyze the genetic basis of self-pollinated crops. | | CO5 | An | 1 |
| 14. | List the breeding designs used in self-pollinated crops. | | CO5 | R | 1 |
| 15. | Define genetic advance. | | CO6 | R | 1 |
| 16. | Explain Vr-Wr graph. | | CO6 | U | 1 |
| 17. | Evaluate the importance of polygenic inheritance of yield traits . | | CO6 | E | 1 |
| 18. | List the factors influencing linkage equilibrium. | | CO1 | R | 1 |
| 19. | Describe linkage drag. | | CO2 | U | 1 |
| 20. | Name the scientist who proposed the joint scaling test . | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate between stability and adaptability. | | CO1 | An | 5 |
| 22. | Explain AMMI biplot model for stability analysis. | | CO2 | U | 5 |
| 23. | Analyze the effect of linkage in generation mean analysis. | | CO3 | An | 5 |
| 24. | Explain the evolutionary forces that disrupts Hardy-Weinberg equilibrium. | | CO4 | U | 5 |
| 25. | Explain the important factors influencing marker assisted selection. | | CO5 | U | 5 |
| 26. | Determine the limitation of various stability models. | | CO6 | A | 5 |
| 27. | Describe the concept of marker-assisted selection and its significance in crop improvement. | | CO1 | U | 5 |
| 28. | Interpret the role of linkage map in a mapping population.. | | CO2 | E | 5 |
| 29. | Compare the mating designs NCDI, II and III. | | CO3 | U | 5 |
| 30. | Describe the development of MAGIC population for fine mapping of genes. | | CO4 | U | 5 |
| 31. | Calculate the components of variance and relationship among them. | | CO5 | A | 5 |
| 32. | Compare the quantitative and qualitative inheritance with example. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Evaluate the significance of coupling and repulsion phase linkage. | CO1 | E | 8 |
|  | b. | Evaluate the various gene effects of Generation Mean Analysis. | CO1 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | Design a diallel mating program to examine the effect of genes. | CO2 | C | 8 |
|  | b. | Examine the steps to construct linkage maps. | CO2 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Design a breeding program to identify QTLs related to non-shattering habit in rice . | CO3 | C | 8 |
|  | b. | Summarize the software's used to map the genes in QTL mapping. | CO3 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Explore the qualitative and quantitative techniques. |
| **CO2** | Evaluate G x E Interaction. |
| **CO3** | Construct saturated linkage maps. |
| **CO4** | Apply Marker-Assisted Selection in plant breeding. |
| **CO5** | Utilize advanced software packages. |
| **CO6** | Analyse biometrical data and interpretation. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6 | 3 | 6 | 5 | 15 | - | 29 |
| **CO2** |  | 9 | - | 7 | 5 | 8 | 29 |
| **CO3** | 2 | 12 | - | 6 | - | 8 | 28 |
| **CO4** | 2 | 12 | - | - | - | - | 14 |
| **CO5** | 1 | 5 | 5 | 1 | - | - | 12 |
| **CO6** | 1 | 6 | 5 | - | 1 | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4040** | **Duration** | **3hrs** |
| **Course Title** | **GENOMICS IN PLANT BREEDING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Determine genome editing. | | CO3 | A | 1 |
| 2. | Define the C-value. | | CO1 | R | 1 |
| 3. | Explain genomic selection. | | CO2 | An | 1 |
| 4. | Interpret structural genomics. | | CO4 | R | 1 |
| 5. | Define the genomic database. | | CO6 | R | 1 |
| 6. | Describe Sanger sequencing. | | CO3 | U | 1 |
| 7. | State one primary difference between TILLING and EcoTILLING. | | CO2 | U | 1 |
| 8. | Identify one example of a PCR-based marker. | | CO2 | R | 1 |
| 9. | Explain sequencing by synthesis. | | CO3 | U | 1 |
| 10. | Name one step in the SAGE library construction. | | CO2 | R | 1 |
| 11. | Define exons. | | CO1 | U | 1 |
| 12. | Determine the purpose of enhancer elements in tagging. | | CO2 | A | 1 |
| 13. | Explain the association analysis in genomics. | | CO4 | U | 1 |
| 14. | Interpret on synteny. | | CO5 | An | 1 |
| 15. | Differentiate between forward and reverse genetics. | | CO6 | A | 1 |
| 16. | Expand QTL. | | CO6 | U | 1 |
| 17. | Define the linkage disequilibrium. | | CO5 | R | 1 |
| 18. | Name a bioinformatics tool for sequence alignment. | | CO6 | R | 1 |
| 19. | Determine a test cross. | | CO5 | U | 1 |
| 20. | Define secondary metabolites. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Examine how nuclear–organellar genome interactions can affect trait expression. | | CO4 | An | 5 |
| 22. | Explain the significance of large repetitive content for *de novo* genome assembly. | | CO1 | A | 5 |
| 23. | Evaluate applications of diversity studies in climate-resilient breeding. | | CO6 | E | 5 |
| 24. | Illustrate how linkage analysis identifies gene-trait associations. | | CO3 | A | 5 |
| 25. | Summarize the basic steps of sequencing-by-ligation. | | CO2 | An | 5 |
| 26. | Compare shotgun sequencing and clone-by-clone strategies. | | CO4 | A | 5 |
| 27. | Examine the role of functional genomics in understanding gene function. | | CO3 | An | 5 |
| 28. | Organize the workflow of forward genetics for gene identification. | | CO6 | C | 5 |
| 29. | Summarize the principle of marker-assisted selection. | | CO5 | E | 5 |
| 30. | Explain the role of germplasm diversity to allele discovery. | | CO1 | An | 5 |
| 31. | Evaluate the integration of cisgenesis with molecular breeding. | | CO3 | E | 5 |
| 32. | Assess the transcriptomics applications in stress-response gene discovery. | | CO4 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Formulate a strategy for incorporating structural genomics outputs into a breeding decision support system. | CO2 | C | 8 |
|  | b. | Evaluate the significance of molecular maps in map-based cloning. | CO2 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | Compare the structural and functional differences across nuclear, chloroplast and mitochondrial genomes in plants. | CO1 | E | 8 |
|  | b. | Assess CRISPR-Cas9 applications in major cereal crops. | CO5 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Propose strategies for integrating phenomics, metabolomics, and genomics data. | CO3 | C | 8 |
|  | b. | Explain the applications of real-time PCR for gene expression analysis. | CO6 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the modern concepts and methods of next-generation sequencing technologies. |
| **CO2** | Apply sequence information to develop pipelines for varietal development. |
| **CO3** | Adopt genome mapping techniques to identify the causative genes for the trait improvement. |
| **CO4** | Acquire skills in advanced and modern molecular approaches in genomic selection. |
| **CO5** | Attain knowledge of molecular markers and marker-assisted selection to develop new climate-resilient varieties. |
| **CO6** | Adopt transgene-free advanced genome editing technologies for crop improvement. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 1 | 5 | 5 | 8 | - | 20 |
| **CO2** | 2 | 1 | 1 | 6 | 7 | 8 | 25 |
| **CO3** | 1 | 2 | 6 | 5 | 5 | 8 | 27 |
| **CO4** | 1 | 1 | 5 | 5 | 5 | - | 17 |
| **CO5** | 1 | 1 | 7 | 1 | 5 | - | 15 |
| **CO6** | 2 | 1 | 1 | 7 | 5 | 5 | 21 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24AG4041** | **Duration** | **3hrs** |
| **Course Title** | **BREEDING DESIGNER CROPS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define an ideotype. | | CO1 | R | 1 |
| 2. | Name the scientists involved in the development of Golden rice. | | CO1 | R | 1 |
| 3. | Give an example for commercially exploited transgenic crop. | | CO1 | R | 1 |
| 4. | Compare C3 and C4 crop photosynthetic efficiency. | | CO2 | U | 1 |
| 5. | Illustrate the role of *sd* gene in green revolution. | | CO2 | U | 1 |
| 6. | Explain parametric physiology. | | CO2 | U | 1 |
| 7. | Differentiate between bio fortification and chemical fortification. | | CO3 | An | 1 |
| 8. | List the molecular markers used in marker-assisted selection. | | CO3 | R | 1 |
| 9. | Explain the mechanism of drought resistance in crops. | | CO3 | R | 1 |
| 10. | Interpret the role of root architecture in water use efficiency. | | CO4 | R | 1 |
| 11. | Explain the role of coevolution in crops. | | CO4 | U | 1 |
| 12. | Explain the importance of multilocation trials in varietal development. | | CO4 | U | 1 |
| 13. | Differentiate between hybrid vigour and heterosis. | | CO5 | An | 1 |
| 14. | Name two quality traits in rice. | | CO5 | R | 1 |
| 15. | Define Biopharming. | | CO6 | R | 1 |
| 16. | Explain the mechanism of submergence tolerance in rice crop. | | CO6 | U | 1 |
| 17. | Evaluate the importance of photosynthetic efficiency in yield. | | CO6 | E | 1 |
| 18. | List the markers used in the selection for QPM. | | CO1 | R | 1 |
| 19. | Explain the role of canopy architecture in yield improvement. | | CO2 | U | 1 |
| 20. | Interpret the genetics of oil content in oilseed crops. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Differentiate between parametric physiology and whole plant physiology. | | CO1 | An | 5 |
| 22. | Explain the genome editing methods available for designing crops | | CO2 | U | 5 |
| 23. | Analyze the relationship between nutrient uptake and nutrient use efficiency. | | CO3 | An | 5 |
| 24. | Explain the role of osmotic adjustment and their implications in drought tolerance. | | CO4 | U | 5 |
| 25. | Evaluate the role of plant genetic resources for the development of designer crops. | | CO5 | U | 5 |
| 26. | Examine the role of isolation requirements in designer crops. | | CO6 | An | 5 |
| 27. | Describe the significance of functional genomics in crop improvement. | | CO1 | U | 5 |
| 28. | Examine the role of scientific committees in bio-safety regulations | | CO2 | A | 5 |
| 29. | Construct suitable gene manipulation strategies for drought tolerance in crops. | | CO3 | C | 5 |
| 30. | Describe the concept of marker-assisted selection and its significance in crop improvement. | | CO4 | U | 5 |
| 31. | Interpret the role of genes for photosynthetic efficiency. | | CO5 | A | 5 |
| 32. | Design a breeding program to improve micro-nutrient content in rice grain. | | CO6 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Evaluate the significance of rice ideotype traits under climate change. | CO1 | E | 8 |
|  | b. | Explain mechanisms for improving nutrient and water use efficiency in crops. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Design a breeding program to enhance the oleic acid composition of oilseeds. | CO2 | C | 8 |
|  | b. | Describe the importance of stay green trait in drought tolerance. | CO2 | C | 7 |
|  |  |  |  |  |  |
| 35. | a. | Analyze the importance of source sink ratio and its manipulation in crop improvement . | CO3 | An | 8 |
|  | b. | Describe the key metabolic pathways involved in conversion of C3 rice to C4 rice. | CO3 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Apply physiological principles to improve crop traits. |
| **CO2** | Analyze and compare various bio fortification techniques to enhance crop nutritional content. |
| **CO3** | Develop and propose effective breeding strategies to create crops with unique traits for specific applications. |
| **CO4** | Demonstrate advanced hybridization techniques in crop breeding. |
| **CO5** | Create and evaluate designer crops with enhanced industrial and pharmaceutical applications. |
| **CO6** | Evaluate and recommend biosafety protocols and post-harvest management practices for designer crop production. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 4 | 12 | - | 5 | 8 | - | 29 |
| **CO2** | - | 9 | 5 | - | - | 15 | 29 |
| **CO3** | 2 | 7 | - | 14 | - | 5 | 28 |
| **CO4** | 2 | 12 | - | - | - | - | 14 |
| **CO5** | 1 | 5 | 5 | 1 | - | - | 12 |
| **CO6** | 1 | 1 | - | 5 | 1 | 5 | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4042** | **Duration** | **3hrs** |
| **Course Title** | **IPR AND REGULATORY MECHANISM** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Describe the primary purpose of introducing IPR globally. | | CO1 | U | 1 |
| 2. | Define derivative work. | | CO1 | R | 1 |
| 3. | Expand WIPO. | | CO1 | R | 1 |
| 4. | Identify the organization responsible for IPR coordination worldwide. | | CO2 | U | 1 |
| 5. | List the types of works that are protected by copyright. | | CO2 | R | 1 |
| 6. | State one provision of the Geographical Indications Act. | | CO2 | R | 1 |
| 7. | Define the term “Industrial Property”. | | CO3 | R | 1 |
| 8. | Identify an example of a protectable design in agricultural machinery. | | CO3 | R | 1 |
| 9. | Expand TRIPs. | | CO3 | U | 1 |
| 10. | Differentiate between GI and Trademark. | | CO4 | U | 1 |
| 11. | State one limitation of patenting biotechnological inventions. | | CO4 | R | 1 |
| 12. | Identify the first Indian IPR law. | | CO4 | R | 1 |
| 13. | Give one example of a crop-related design. | | CO5 | R | 1 |
| 14. | Define patent infringement. | | CO5 | U | 1 |
| 15. | Explain the essentially derived variety. | | CO6 | A | 1 |
| 16. | State the minimum duration of patent protection under TRIPs. | | CO6 | R | 1 |
| 17. | Name the international treaty on plant genetic resources. | | CO6 | U | 1 |
| 18. | List two examples of IPR in agriculture. | | CO1 | R | 1 |
| 19. | Differentiate between a patent and a design. | | CO3 | A | 1 |
| 20. | Explain the purpose of Standard Material Transfer Agreements. | | CO4 | An | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Create a timeline highlighting major global milestones in IPR development. | | CO1 | C | 5 |
| 22. | Explain the procedure for cancellation of a registered design. | | CO2 | An | 5 |
| 23. | Dissect the contribution of international conventions in shaping global IPR policy. | | CO1 | An | 5 |
| 24. | Examine the limitations of patent protection for CRISPR-edited crops. | | CO3 | An | 5 |
| 25. | Assess the implications of TRIPs on biotechnology innovation. | | CO2 | E | 5 |
| 26. | Illustrate how trade secrets benefit seed companies. | | CO2 | A | 5 |
| 27. | Explain the procedure of patent filing in India. | | CO5 | An | 5 |
| 28. | Evaluate the impact of IPR on knowledge dissemination. | | CO3 | E | 5 |
| 29. | Analyze a case study of trademark violation in plant variety branding. | | CO4 | An | 5 |
| 30. | Evaluate the role of CBD in traditional knowledge protection. | | CO5 | E | 5 |
| 31. | Examine the limitations of IPR in protecting traditional knowledge with case studies. | | CO6 | An | 5 |
| 32. | Propose strategies to enhance farmers’ participation in variety registration. | | CO4 | C | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Develop a strategy for universities to commercialize patents effectively. | CO6 | C | 8 |
|  | b. | Assess the impact of digitalization on copyright enforcement. | CO1 | E | 7 |
|  |  |  |  |  |  |
| 34. | a. | Propose institutional policies to safeguard copyright in research outputs. | CO2 | C | 8 |
|  | b. | Examine the interrelation between trademarks and farmers’ rights under PPV&FR Act. | CO4 | A | 7 |
|  |  |  |  |  |  |
| 35. | a. | Examine global case laws on biopiracy of plant species. | CO5 | A | 8 |
|  | b. | Compare India’s Design Act to EU design protection regulations. | CO1 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand TRIPs and IPR protection. |
| **CO2** | Strategize their registration for inventions/designs, in India and abroad. |
| **CO3** | Remember plagiarism, which can be questioned legally. |
| **CO4** | Explain UPOV and PPV & FR Act of India. |
| **CO5** | Apply, Analyze and use CBD strategies for the Conservation of Biodiversity. |
| **CO6** | Evaluate the strategies for Licensing, MTAs and Research Collaboration Agreements. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 1 | 7 | 5 | 5 | 7 | 28 |
| **CO2** | 2 | 1 | 5 | 5 | 8 | 5 | 26 |
| **CO3** | 1 | 2 | 1 | 5 | 5 | - | 14 |
| **CO4** | 1 | 2 | 7 | 6 | - | 5 | 21 |
| **CO5** | 1 | 1 | 8 | 5 | 5 | - | 20 |
| **CO6** | 1 | 1 | 1 | 5 | - | 8 | 16 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4048** | **Duration** | **3hrs** |
| **Course Title** | **ADVANCES IN PLANT BREEDING SYSTEMS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | The ABC model of flowering in plants was given by------------. | | CO2 | R | 1 |
| 2. | List the key genes for sepals and petals in flowers. | | CO2 | R | 1 |
| 3. | State the role of DNA fingerprinting in genetic diversity analysis. | | CO3 | U | 1 |
| 4. | Define Gene Pyramiding. | | CO2 | R | 1 |
| 5. | Explain speed breeding. | | CO3 | R | 1 |
| 6. | Define clone and give two examples for clonally propagated crops. | | CO4 | R | 1 |
| 7. | State the advantage of using double haploid lines in breeding. | | CO2 | R | 1 |
| 8. | Differentiate between pure line and multiline with an example. | | CO5 | U | 1 |
| 9. | Define bridge cross with an example. | | CO5 | R | 1 |
| 10. | Explain backcross. | | CO2 | R | 1 |
| 11. | Expand IRRI and ICRISAT. | | CO1 | R | 1 |
| 12. | Define clonal selection. | | CO2 | U | 1 |
| 13. | List the pre-Mendelian methods used in self-pollinated crops. | | CO3 | R | 1 |
| 14. | List the breeding objectives for organic cultivation in crops. | | CO4 | U | 1 |
| 15. | The process of transfer of a gene from a donor to a recipient is known as introgression (True/False). | | CO4 | R | 1 |
| 16. | ----------- is the process of formation of seeds without fertilization. | | CO1 | R | 1 |
| 17. | Who proposed the concept of ideotype? | | CO1 | R | 1 |
| 18. | Give two examples for codominant markers. | | CO3 | U | 1 |
| 19. | Explain embryo rescue technique. | | CO5 | U | 1 |
| 20. | ---------- is the male sterile cytoplasm commonly used in rice. | | CO2 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the transgenic male sterility in plants with a suitable example. | | CO2 | U | 5 |
| 22. | Describe the breeding methods involved in handling segregating populations of cross-pollinated crops. | | CO1 | U | 5 |
| 23. | Describe the gametophytic and sporophytic self-incompatibility in plants. | | CO1 | R | 5 |
| 24. | Explain ideotype breeding. Describe the steps involved in developing ideotypes in plants. | | CO5 | U | 5 |
| 25. | Summarize the screening techniques for drought tolerance in rice. | | CO6 | U | 5 |
| 26. | Explain the role of apomixis in heterosis breeding of crops. | | CO2 | R | 5 |
| 27. | Describe the importance and development of golden rice and elaborate the ethical and safety concerns for its commercial cultivation. | | CO6 | U | 5 |
| 28. | Differentiate between Pedigree and Bulk method of breeding in crops. | | CO1 | U | 5 |
| 29. | Explain marker assisted backcross. Describe the features and process involved in a marker assisted backcross. | | CO3 | R | 5 |
| 30. | Identify and explain the type of cross combinations given below.   1. (A X B) X B 2. (A X B) X (C X D) 3. Inbred X Inbred 4. (A X B) X (C X D) X (E X F) X (G X H) 5. (A X A) | | CO1 | A | 5 |
| 31. | Explain the biochemical and molecular basis of self-incompatibility. | | CO2 | U | 5 |
| 32. | Describe the role of environmental sensitive genetic male sterility in heterosis breeding with an example in rice. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | As a rice breeder, you're working with the high-yielding variety CO 18, which, unfortunately, is susceptible to blast disease. Your goal is to develop an improved version of CO 18 that is resistant to blast by transferring the recessive blast-resistant gene from IR 16. Design a breeding strategy to introduce this resistance trait into CO 18. | CO1 | A | 8 |
|  | b. | Describe the process of genetic transformation involved in developing Bt cotton and illustrate the impact of cry proteins in gut of bollworms. | CO4 | U | 7 |
| 34. | a. | Explain the gene pyramiding strategies involved in stacking multiple genes in crops. | CO3 | U | 8 |
|  | b. | Describe the pre and post fertilization barriers involved in wide hybridization. | CO2 | R | 7 |
| 35. | a. | Define marker-assisted selection. Elaborate the classification of molecular markers and their applications in crop improvement. | CO3 | R | 8 |
|  | b. | Define a gene pool. Describe the concept and classification of gene pools in plants. | CO5 | U | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Conceptualize various breeding methodologies. |
| **CO2** | Compare the principles and procedures for the formation of a complex population. |
| **CO3** | Explore the tools used in MAS. |
| **CO4** | Analyze the various procedures in gene pyramiding. |
| **CO5** | Acquire skills in utilization of germplasm. |
| **CO6** | Examine the trends in breeding for climate change. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 8 | 10 | 13 | - | - | - | 31 |
| **CO2** | 18 | 11 | - | - | - | - | 29 |
| **CO3** | 15 | 10 | - | - | - | - | 25 |
| **CO4** | 2 | 8 | - | - | - | - | 10 |
| **CO5** | 1 | 14 | - | - | - | - | 15 |
| **CO6** | - | 15 | - | - | - | - | 15 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **25AG4055** | **Duration** | **3hrs** |
| **Course Title** | **APPLIED REGRESSION ANALYSIS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define correlation and state its types. | | CO1 | R | 1 |
| 2. | Write the formula for Karl Pearson’s coefficient of correlation. | | CO1 | A | 1 |
| 3. | Define range of correlation coefficient (r)? | | CO1 | R | 1 |
| 4. | Distinguish between simple and multiple correlation. | | CO1 | E | 1 |
| 5. | Explain autocorrelation? | | CO2 | U | 1 |
| 6. | Describe formula for Durbin–Watson statistic. | | CO2 | U | 1 |
| 7. | State multicollinearity? | | CO2 | R | 1 |
| 8. | State two consequences of multicollinearity. | | CO2 | R | 1 |
| 9. | Define regression analysis? | | CO3 | R | 1 |
| 10. | State the assumptions of the least squares method. | | CO3 | R | 1 |
| 11. | Explain partial regression coefficient? | | CO3 | U | 1 |
| 12. | Define weighted least squares (WLS). | | CO4 | R | 1 |
| 13. | Mention one method of selecting the best regression equation. | | CO4 | R | 1 |
| 14. | Define heteroscedasticity? | | CO5 | R | 1 |
| 15. | State one test for detecting heteroscedasticity. | | CO5 | R | 1 |
| 16. | Explain nonlinear regression? | | CO6 | U | 1 |
| 17. | Give an example of an exponential regression equation. | | CO6 | U | 1 |
| 18. | State an orthogonal polynomial? | | CO6 | R | 1 |
| 19. | Write the general equation of a quadratic regression model. | | CO6 | A | 1 |
| 20. | State one agricultural application of regression analysis. | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Compute Karl Pearson’s correlation coefficient for  X = [2, 4, 6, 8, 10] and Y = [3, 6, 8, 10, 12], and interpret the result. | | CO1 | A | 5 |
| 22. | Differentiate rank correlation from product–moment correlation using suitable examples. | | CO1 | U | 5 |
| 23. | Describe the procedure for detecting autocorrelation using Durbin–Watson test. | | CO2 | U | 5 |
| 24. | Analyze multicollinearity using Variance Inflation Factor (VIF) and outline corrective measures. | | CO2 | A | 5 |
| 25. | Construct a simple linear regression equation for  X = [1, 2, 3, 4, 5] and Y = [2, 3, 5, 4, 6] using the least squares method. | | CO3 | A | 5 |
| 26. | Summarize the differences between multiple and partial regression. | | CO3 | U | 5 |
| 27. | Explain the principle and need for weighted least squares estimation. | | CO4 | U | 5 |
| 28. | Compare different model selection techniques used in regression analysis. | | CO4 | A | 5 |
| 29. | Describe the causes and effects of heteroscedasticity in regression analysis. | | CO5 | U | 5 |
| 30. | Apply statistical tests to detect heteroscedasticity in a given regression model. | | CO5 | A | 5 |
| 31. | Explain the use of nonlinear regression models in agricultural research. | | CO6 | U | 5 |
| 32. | Interpret the use of exponential regression and orthogonal polynomials in model fitting. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Derive the normal equations for fitting Y = a + bX by the least squares method. | CO3 | U | 7.5 |
|  | b. | Illustrate the procedure for testing the significance of regression coefficients. | CO3 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Describe the causes and consequences of multicollinearity in regression models. | CO4 | U | 7.5 |
|  | b. | Propose suitable statistical remedies to correct multicollinearity. | CO4 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Analyze nonlinear regression models such as quadratic, exponential, and power functions with suitable examples. | CO6 | U | 7.5 |
|  | b. | Evaluate the use of regression analysis in determining economic and optimal doses. | CO6 | U | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Comprehend the definitions and measures of correlation, including rank correlation and multiple/partial correlation coefficients. |
| **CO2** | Detect and test for correlated errors, autocorrelation, and multicollinearity, and apply these concepts in regression models. |
| **CO3** | Apply the method of least squares for regression analysis, including curve fitting and testing regression coefficients in multiple and partial regression models. |
| **CO4** | Analyze diagnostic measures such as Durbin-Watson statistics, heteroscedastic models, and multicollinearity correction techniques to improve regression models. |
| **CO5** | Evaluate the best regression equations and perform model selection using techniques such as weighted least squares and regression on grouped data. |
| **CO6** | Create nonlinear regression models, including quadratic, exponential, and power curves, and apply them to determine optimal economic doses and fit orthogonal polynomials. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 5 | 6 |  | 1 |  | 14 |
| **CO2** | 2 | 7 | 5 |  |  |  | 14 |
| **CO3** | 3 | 21 | 5 |  |  |  | 29 |
| **CO4** | 2 | 20 | 5 |  |  |  | 27 |
| **CO5** | 2 | 5 | 5 |  |  |  | 12 |
| **CO6** | 1 | 27 | 1 |  |  |  | 29 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24AG4082** | **Duration** | **3hrs** |
| **Course Title** | **STATISTICAL METHODS FOR APPLIED SCIENCES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define **descriptive statistics**. | | CO1 | R | 1 |
| 2. | Describe the term **box-plot**. | | CO1 | U | 1 |
| 3. | List **any two measures of central tendency**. | | CO1 | R | 1 |
| 4. | State the meaning of **random variable**. | | CO2 | R | 1 |
| 5. | State **one property** of a **normal distribution**. | | CO2 | R | 1 |
| 6. | Define **probability**. | | CO2 | R | 1 |
| 7. | Explain the **use of correlation analysis**. | | CO3 | U | 1 |
| 8. | Recall the **formula for Karl Pearson’s correlation coefficient**. | | CO3 | R | 1 |
| 9. | Describe the concept of **regression analysis**. | | CO3 | U | 1 |
| 10. | Define a **non-parametric test**. | | CO4 | R | 1 |
| 11. | Identify **one example** of a **non-parametric test**. | | CO4 | R | 1 |
| 12. | Explain the **purpose of the sign test**. | | CO4 | U | 1 |
| 13. | Define **ANOVA**. | | CO5 | R | 1 |
| 14. | Summarize the idea of **one-way ANOVA**. | | CO5 | U | 1 |
| 15. | Define **simple random sampling**. | | CO6 | R | 1 |
| 16. | Explain the **importance of sampling** in agricultural research. | | CO6 | U | 1 |
| 17. | Mention **any one type of data transformation**. | | CO6 | R | 1 |
| 18. | Describe the process of **exploratory data analysis (EDA)**. | | CO1 | U | 1 |
| 19. | Define **probability distribution**. | | CO2 | R | 1 |
| 20. | State **one assumption** of **ANOVA**. | | CO5 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the different **measures of dispersion** with suitable examples. | | CO1 | U | 5 |
| 22. | Illustrate the **properties and agricultural applications** of a **normal distribution**. | | CO2 | U | 5 |
| 23. | Describe the **concept of sampling distribution** and its **importance**. | | CO2 | U | 5 |
| 24. | Differentiate between **correlation** and **regression** analysis. | | CO3 | U | 5 |
| 25. | Compute **Karl Pearson’s correlation coefficient** for the given data and **interpret** the result. | | CO3 | A | 5 |
| 26. | Outline the **steps in hypothesis testing** using the **t-distribution**. | | CO2 | U | 5 |
| 27. | Describe the **procedure for conducting a sign test**. | | CO4 | U | 5 |
| 28. | Summarize the **Mann–Whitney U-test** and its **applications**. | | CO4 | U | 5 |
| 29. | Demonstrate **one-way ANOVA** with a suitable example. | | CO5 | U | 5 |
| 30. | Compare **one-way** and **two-way ANOVA**. | | CO5 | U | 5 |
| 31. | Explain the **types of sampling methods** used in agricultural research. | | CO6 | U | 5 |
| 32. | Describe **data transformation techniques** and their **uses** in analysis. | | CO6 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Discuss the **concept of probability** and **illustrate** the **addition and multiplication theorems** with examples. | CO2 | A | 7 |
|  | b. | Construct and **interpret a box-plot** using **agricultural data**. | CO1 | A | 8 |
|  |  |  | CO3 | A | 7 |
| 34. | a. | Fit a **simple linear regression equation** to a given dataset and **interpret** the results. *(Use suitable numerical example.)* | CO3 | U | 8 |
|  | b. | Explain the **importance of estimation** and **confidence intervals** in agricultural research. | CO5 | A | 7 |
|  |  |  | CO4 | U | 8 |
| 35. | a. | Describe the **procedures for one-way and two-way ANOVA** and **interpret** the results. | CO5 | A | 7 |
|  | b. | Explain the **steps for conducting non-parametric tests** (Sign test and Wilcoxon test) and their **significance**. | CO4 | U | 8 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Validate the agricultural data using graphical representations and exploratory data analysis. |
| **CO2** | Utilize the basic principles of probability and identify the probability distributions of the agricultural variables. |
| **CO3** | Estimate the statistical parameters with their confidence intervals. |
| **CO4** | Identify and quantify the relationship between the agricultural variables. |
| **CO5** | Use the non-parametric tools to solve problems in social sciences |
| **CO6** | Select the suitable sampling methods and analyse the data using suitable statistical tools. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 7 | 8 |  |  |  | 17 |
| **CO2** | 4 | 15 | 7 |  |  |  | 26 |
| **CO3** | 1 | 14 | 12 |  |  |  | 27 |
| **CO4** | 2 | 19 |  |  |  |  | 21 |
| **CO5** | 1 | 12 | 8 |  |  |  | 21 |
| **CO6** | 2 | 11 |  |  |  |  | 13 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| **Course Code** | **24HO3128** | **Duration** | **3hrs** |
| **Course Title** | **SUBTROPICAL AND TEMPERATE FRUIT PRODUCTION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Triple sigmoidal growth pattern is observed in \_\_\_\_\_\_\_\_\_ | | CO1 | U | 1 |
| 2. | The wine prepared from pear fruit is called as \_\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 3. | Among temperate fruits lowest chilling requirement is for which fruit crop? | | CO1 | A | 1 |
| 4. | King of nuts is \_\_\_\_\_\_\_\_\_\_\_\_ | | CO5 | R | 1 |
| 5. | Strawberry is propagated by \_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 6. | Fuzzless smooth skinned peach is \_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 7. | Give example for a variety in Pomegranate | | CO5 | R | 1 |
| 8. | Citrus dieback is due to\_\_\_\_\_\_\_\_ | | CO4 | U | 1 |
| 9. | Stella is the variety of \_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | R | 1 |
| 10. | Fruit cracking in Pomegranate is due to \_\_\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| 11. | \_\_\_\_\_\_\_\_\_\_\_is the standard dwarf rootstock for pear | | CO2 | R | 1 |
| 12. | Apoplexy is a physiological disorder caused due to high temperature in\_\_\_\_\_\_ | | CO4 | R | 1 |
| 13. | Dried litchi is known as\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 14. | Explain water core in apple | | CO4 | U | 1 |
| 15. | Define cincturing | | CO3 | U | 1 |
| 16. | What are Prunes? | | CO6 | R | 1 |
| 17. | Define Gridling | | CO3 | R | 1 |
| 18. | What is chilling requirement in fruit crops? | | CO2 | A | 1 |
| 19. | Explain cross protection | | CO2 | An | 1 |
| 20. | Define Granulation | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the important operations in grapes production | | CO1 | An | 5 |
| 22. | Define parthenocarpy and its types in subtropical and temperate fruits with example | | CO5 | U | 5 |
| 23. | Explain the importance of different rootstocks used in temperate fruit crops | | CO2 | E | 5 |
| 24. | List out some of the important i) species of *Prunus* and ii) varieties of plum | | CO2 | R | 5 |
| 25. | Give i) botanical name, ii) inflorescence type, iii) type of fruit, iv) Parthenocarpy | | CO1 | C | 5 |
|  | type and v) Propagation of Persimmon | |  |  |  |
| 26. | What is Bahar treatment? And explain different types of Bahar treatment | | CO4 | A | 5 |
| 27. | Give different grades of apple based on Agmark (Ind), USDA and Himachal Pradesh | | CO6 | E | 5 |
| 28. | Classify grapes based on its use and give example for each | | CO4 | R | 5 |
| 29. | Explain in detail about the physiological disorders in Citrus | | CO4 | R | 5 |
| 30. | Define training and explain different types of training followed in fruit crops | | CO3 | U | 5 |
| 31. | List out the rootstocks used for citrus and explain its characteristic features | | CO2 | R | 5 |
| 32. | Explain the different methods of grafting adopted for subtropical and temperate fruits | | CO5 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Describe the harvesting indices and post-harvest handling of Pomegranate | CO6 | An | 7.5 |
|  | b. | Define Citrus decline and discuss the factors that causes citrus decline | CO4 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the multistory cropping system, it’s advantages and limitations in sub-tropical and temperate fruit crops with example | CO3 | C | 8 |
|  | b. | Discuss in detail the special viticultural practices | CO5 | E | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the use of i) plant growth regulators and ii) crop regulation practices in quality improvement of grapes | CO5 | A | 7.5 |
|  | b. | Explain in detail about the production technology of Kiwi | CO1 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Get acquainted with ecological specifications, seasonal variations and pertinent cultural practices of subtropical and temperate fruits. |
| **CO2** | Undertake the production of elite planting material of major fruit crops with rootstocks suited for specific situations. |
| **CO3** | Undertake cultivation of subtropical and temperate fruit crops on scientific basis. |
| **CO4** | Maintain a subtropical and temperate fruit orchard by applying knowledge obtained |
| **CO5** | Produce superior quality of subtropical and temperate fruits by applying specific strategies |
| **CO6** | Apply modern methods of ripening, packaging and storing of subtropical and temperate fruits. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 8.5 | 1 | 1 | 5 |  | 5 | 20.5 |
| **CO2** | 12 | 5 | 1 | 1 | 5 |  | 24.0 |
| **CO3** | 3 | 1 |  |  |  | 7.5 | 11.5 |
| **CO4** | 12 | 9.5 | 5 |  |  |  | 26.5 |
| **CO5** | 2 | 10 | 7.5 |  | 7.5 |  | 27.0 |
| **CO6** | 3 |  |  | 7.5 | 5 |  | 15.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **24HO3129** | **Duration** | **3hrs** |
| **Course Title** | **PROPAGATION AND NURSERY MANAGEMENT OF FRUIT CROPS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define the Asexual propagation. | | CO1 | U | 1 |
| 2. | Differentiate ‘Separation’ from ‘Division’ | | CO1 | A | 1 |
| 3. | What is Root cutting, state an example for the same? | | CO1 | R | 1 |
| 4. | Explain the Polyembryony. | | CO2 | An | 1 |
| 5. | Define the Apomixis. | | CO2 | U | 1 |
| 6. | Write a short note about Sexual Propagation. | | CO2 | R | 1 |
| 7. | Differentiate the ‘seed viability’ from ‘longevity’ | | CO3 | A | 1 |
| 8. | What is rejuvenation? | | CO3 | R | 1 |
| 9. | List out the Considerations for rejuvenation. | | CO3 | R | 1 |
| 10. | State the symptoms of incompatibility. | | CO4 | R | 1 |
| 11. | Define the Clonal rootstock. | | CO4 | U | 1 |
| 12. | Explain the Intergeneric grafting. | | CO4 | An | 1 |
| 13. | Define the Acclimatization. | | CO5 | U | 1 |
| 14. | Mention the important media used for tissue culture. | | CO5 | C | 1 |
| 15. | What is the media composition for fruits plants? | | CO6 | E | 1 |
| 16. | Write about Pre-curing of scion. | | CO6 | R | 1 |
| 17. | How will you overcome incompatibility between the stock and scion? | | CO6 | E | 1 |
| 18. | Classify the cuttings method of propagation. | | CO1 | U | 1 |
| 19. | Explain about the Seed priming. | | CO2 | An | 1 |
| 20. | State the salient features of rootstock parents | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out the various advantages of asexual propagation | | CO1 | R | 5 |
| 22. | Define Seed coating and it’s types | | CO2 | U | 5 |
| 23. | Explain about Bridge grafting | | CO3 | An | 5 |
| 24. | Mention the causes of graft incompatibility | | CO4 | C | 5 |
| 25. | Differentiate the Meristem culture and Embryo culture | | CO5 | A | 5 |
| 26. | Explain the Plant propagation structures and its advantages | | CO6 | An | 5 |
| 27. | Discuss the T-budding method of propagation | | CO1 | E | 5 |
| 28. | Explain the Seed treatment, benefits and types. | | CO2 | An | 5 |
| 29. | What are the techniques for orchard rejuvenation? | | CO3 | R | 5 |
| 30. | Mention the factors for successful graft union | | CO4 | C | 5 |
| 31. | Discuss the merits of micro propagation | | CO5 | E | 5 |
| 32. | List out the characteristics of propagation medium. | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Briefly explain the Air layering propagation in fruit crops | CO1 | U | 7.5 |
|  | b. | Discuss the types of dormancy and methods to overcome the dormancy | CO2 | C | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Give detail account on Top working | CO3 | E | 7.5 |
|  | b. | What is the Root stock and Scion   1. Write the effect of stocks on scion cultivars 2. Write the effect of scion on rootstock | CO4 | R | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Briefly explain the Micropropagation and Its Stages | CO5 | An | 7.5 |
|  | b. | Discuss the role of containers for propagation | CO6 | C | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Apply the principles and methods of asexual propagation successfully. |
| **CO2** | Run a seed industry after learning the issues associated with industry |
| **CO3** | Take up rejuvenation of old and traditional orchards for upgradation |
| **CO4** | Own a scion bank of elite varieties of commercial fruit crops in scientific manner |
| **CO5** | Get employed in successful tissue culture labs or can run their own tissue culture labs |
| **CO6** | Establish their own fruit nursery producing elite plants in major fruit growing tracts |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6.0 | 9.5 | 1.0 | - | 5.0 | - | 20.50 |
| **CO2** | 1.0 | 6.0 | - | 8.0 | - | 7.5 | 22.50 |
| **CO3** | 7.0 | - | 1.0 | 5.0 | 7.5 | - | 20.50 |
| **CO4** | 9.5 | 1.0 | - | 1.0 | - | 10 | 21.50 |
| **CO5** | - | 1.0 | 5.0 | 7.5 | 5.0 | 1.0 | 19.50 |
| **CO6** | 6.0 | - | - | 5.0 | 2.0 | 7.5 | 20.50 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **24HO3133** | **Duration** | **3hrs** |
| **Course Title** | **GROWTH AND DEVELOPMENT OF FRUIT CROPS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define primary meristems. | | CO1 | R | 1 |
| 2. | What is meant by growth analysis? | | CO1 | R | 1 |
| 3. | What is morphogenesis? | | CO1 | U | 1 |
| 4. | Define a heat unit. | | CO2 | U | 1 |
| 5. | What is photoperiodism? | | CO2 | R | 1 |
| 6. | Define vernalization. | | CO2 | R | 1 |
| 7. | Mention one role of potassium in fruit development. | | CO3 | R | 1 |
| 8. | Write the deficiency symptoms of boron. | | CO3 | U | 1 |
| 9. | Define assimilate partitioning. | | CO3 | R | 1 |
| 10. | Define stimulative parthenocarpy. | | CO4 | R | 1 |
| 11. | What is juvenility? | | CO4 | U | 1 |
| 12. | Define bud dormancy. | | CO4 | R | 1 |
| 13. | Mention the physiological role of ABA. | | CO5 | R | 1 |
| 14. | Name any two stress conditions that stimulate ethylene biosynthesis. | | CO5 | R | 1 |
| 15. | What is triple response? | | CO6 | R | 1 |
| 16. | Mention the precursors of auxin and cytokinin. | | CO6 | R | 1 |
| 17. | Write the major role of jasmonic acid. | | CO6 | U | 1 |
| 18. | Define the grand period of growth. | | CO1 | R | 1 |
| 19. | What is PAR? | | CO2 | U | 1 |
| 20. | Write any one advantage of dormancy. | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Explain the phases of growth curve in fruit crops. | | CO1 | U | 5 |
| 22. | Discuss the influence of climatic factors on fruit crop development. | | CO2 | A | 5 |
| 23. | Enumerate the deficiency symptoms of nitrogen, phosphorus and potassium. | | CO3 | A | 5 |
| 24. | Explain the biochemical and physiological changes during bud dormancy and bud break. | | CO4 | A | 5 |
| 25. | How do fruit crops respond to stress? Explain the physiological mechanisms involved. | | CO5 | An | 5 |
| 26. | Discuss the application of PGRs in enhancing fruit set and yield in fruit crops | | CO6 | U | 5 |
| 27. | Explain the process of morphogenesis and its importance in fruit crops. | | CO1 | A | 5 |
| 28. | Describe the role of light intensity and photoperiod in fruit crop development. | | CO2 | A | 5 |
| 29. | Narrate the factors affecting the absorption of water in plants. | | CO3 | An | 5 |
| 30. | Explain the stages of fruit growth and ripening. | | CO4 | U | 5 |
| 31. | Discuss the methods to overcome stress in fruit crops. | | CO5 | An | 5 |
| 32. | Explain the canopy management through growth retardants in fruit crops. | | CO6 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain in detail the source-sink relationship in fruit crops. | CO1 | An | 8 |
|  | b. | Discuss the growth analysis parameters in detail. | CO1 | An | 7 |
|  |  |  |  |  |  |
| 34. | a. | Describe the influence of internal factors on the growth and development of fruit crops. | CO2 | E | 8 |
|  | b. | Elaborate on thermoperiodism and its significance in fruit production. | CO2 | E | 7 |
|  |  |  |  |  |  |
| 35. | a. | Describe the developmental physiology of fruit set and seed development. | CO3 | C | 8 |
|  | b. | Evaluate the role of growth regulators in manipulating the fruit yield and quality. | CO3 | C | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Define the fundamental concepts of growth and development physiology of fruit crops. |
| **CO2** | Analyze the effect of environmental factors in the growth and development of fruit crops |
| **CO3** | Analyze the effect of water and mineral nutrition in the growth and development of fruit crops. |
| **CO4** | Evaluate and remediate the various biochemical and physiological processes in the growth and development of fruit crops. |
| **CO5** | Adopt strategies for stress management in the growth and development processes of fruit crops. |
| **CO6** | Apply suitable PGRs for manipulation of the growth and development of fruit crops. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 6 | 5 | 15 | - | - | 29 |
| **CO2** | 2 | 2 | 10 | - | 15 | - | 29 |
| **CO3** | 2 | 1 | 5 | 5 | - | 15 | 28 |
| **CO4** | 3 | 6 | 5 | - | - | - | 14 |
| **CO5** | 2 | - | - | 10 | - | - | 12 |
| **CO6** | 2 | 6 | 5 | - | - | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **25AG101** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF AGRONOMY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | -------- is a branch of agricultural science which deals with principles and practices of soil, water and crop management | | CO1 | U | 1 |
| 2. | Cultivated species of rice out of identified 21 species is------ | | CO1 | U | 1 |
| 3. | Who is the first person used the definition of weed------ | | CO3 | R | 1 |
| 4. | First cultivated crops in the world are------- | | CO2 | R | 1 |
| 5. | Richest source of protein among the food grain is----- | | CO2 | A | 1 |
| 6. | Number of essential elements required for plant growth is ------ | | CO3 | R | 1 |
| 7. | Plough was invented during------- | | CO3 | U | 1 |
| 8. | RH is the highest during------- | | CO1 | R | 1 |
| 9. | Subsoil compaction is broken by---------- | | CO1 | U | 1 |
| 10. | Which is the secondary tillage operation------- | | CO2 | R | 1 |
| 11. | Mechanical manipulation of soil with tools and implements is called-------- | | CO4 | U | 1 |
| 12. | Major soil type in India is----- | | CO4 | R | 1 |
| 13. | -------- is the high rainfall zone in Tamil nadu | | CO5 | U | 1 |
| 14. | Which of the secondary nutrients for plant growth--- | | CO2 | A | 1 |
| 15. | Which soil is containing more water holding capacity? | | CO5 | U | 1 |
| 16. | pH of black soil is\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 17. | Crop responds well for deep ploughing is------ | | CO6 | U | 1 |
| 18. | Based on morphology, the weed is classified into? | | CO1 | R | 1 |
| 19. | India is divided in -------- agro climatic region? | | CO2 | U | 1 |
| 20. | First introduced herbicide (in organic) in the world is----- | | CO3 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Describe scope of agronomy | | CO3 | A | 5 |
| 22. | Define about western Himalayan zone | | CO5 | U | 5 |
| 23. | Define dibbling | | CO4 | An | 5 |
| 24. | Describe zero tillage | | CO2 | E | 5 |
| 25. | Explain about sowing methods | | CO1 | A | 5 |
| 26. | Explain the characteristics of weed | | CO1 | E | 5 |
| 27. | Define plant geometry | | CO2 | E | 5 |
| 28. | Define allelopathy | | CO3 | R | 5 |
| 29. | List out the merits and demerits of mechanical weed control | | CO3 | R | 5 |
| 30. | Describe the scope and importance of agriculture in India and Tamilnadu. | | CO4 | U | 5 |
| 31. | Describe the agronomic interventions for enhancing FUE | | CO4 | U | 5 |
| 32. | Describe about factors affecting seed germination | | CO2 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain about woman in agriculture and empowerment | CO3 | A | 7 |
|  | b. | Describe about factors affecting crop production | CO1 | An | 8 |
|  |  |  |  |  |  |
| 34. | a. | Brief explain about role of manures and fertilizers in crop production | CO4 | E | 7 |
|  | b. | Discuss about types of seeds and seed treatment | CO2 | R | 8 |
|  |  |  |  |  |  |
| 35. | a. | List out the major soils in India. | CO5 | A | 8 |
|  | b. | Explain the harmful and beneficial effect of weeds | CO4 | E | 7 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | *Evaluate*the principles of crop adaptation and distribution across agro-climatic zones for selecting region-specific field crops. |
| CO2 | *Implement*appropriate tillage practices, sowing methods, and planting geometry to enhance crop growth and productivity. |
| CO3 | *Schedule*irrigation and fertigation practices based on crop growth stages and soil moisture dynamics. |
| CO4 | *Recommend*integrated nutrient and weed management strategies to optimize input use efficiency and crop yield. |
| CO5 | *Develop*sustainable cropping systems suited for diverse agro-ecological conditions to improve long-term farm resilience. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 9 | 3 | 5 |  | 7 | - | 24 |
| CO2 | 7 | 1 | 2 | 8 | 10 | - | 28 |
| CO3 | 13 | 1 | 12 | - | - | - | 26 |
| CO4 | 1 | 11 |  | 5 | 10 |  | 27 |
| CO5 |  | 7 | 8 | 5 |  |  | 20 |
| CO6 |  |  |  |  |  |  |  |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **25AG102** | **Duration** | **3hrs** |
| **Course Title** | **FARMING BASED LIVELYHOOD SYSTEMS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Farming systems are a source of income and\_\_\_\_\_\_\_\_\_ for millions of people worldwide | | CO1 | U | 1 |
| 2. | Punjab is renowned for its extensive wheat and rice cultivation called\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Agro forestry is the term integrates trees with \_\_\_\_\_ | | CO1 | R | 1 |
| 4. | The term farming covers a wide spectrum of \_\_\_\_\_\_ | | CO2 | U | 1 |
| 5. | A system where livestock are moved seasonally in search of grazing areas is called\_\_\_\_ | | CO2 | A | 1 |
| 6. | The practice of growing a single crop on a large scale is known as------------- | | CO2 | U | 1 |
| 7. | State the full form of the abbreviation ‘MSME’ | | CO3 | R | 1 |
| 8. | The activity that brings a basic agricultural product from production in the field to final consumption is called\_\_\_\_\_ | | CO3 | U | 1 |
| 9. | Small enterprises are generally have \_\_\_\_ employees | | CO3 | R | 1 |
| 10. | How many agro climatic zones in India\_\_\_\_\_ | | CO4 | R | 1 |
| 11. | The region has high rainfall and coastal ecosystem\_\_\_\_\_\_ | | CO4 | U | 1 |
| 12. | Improved IFS model results in \_\_\_\_% higher water productivity | | CO4 | U | 1 |
| 13. | PM-KISAN launched in the year ------------ | | CO5 | R | 1 |
| 14. | NBM mainly focuses on the development of complete value chain of \_\_\_ sector | | CO5 | R | 1 |
| 15. | Transferring of carbon from the atmosphere to plants and soil through photosynthesis is known as \_\_\_\_\_ | | CO5 | R | 1 |
| 16. | Solar powered irrigation is done through\_\_\_\_\_ | | CO3 | U | 1 |
| 17. | India’s first fully organic state | | CO2 | R | 1 |
| 18. | \_\_\_\_\_is the most important component of farming system | | CO1 | U | 1 |
| 19. | Protected cultivation is also known as | | CO2 | R | 1 |
| 20. | Expand IWMP\_\_\_\_\_\_\_\_\_\_ | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | List out the factors affecting income. | | CO1 | R | 5 |
| 22. | Define aquaculture, tissue culture and controlled environment agriculture. | | CO2 | U | 5 |
| 23. | Explain agroforestry and its benefits. | | CO3 | R | 5 |
| 24. | Describe the government policies and initiatives of IFS. | | CO4 | U | 5 |
| 25. | List out the risk factors of markets. | | CO5 | R | 5 |
| 26. | Give any two examples for cooperatives. | | CO5 | R | 5 |
| 27. | Define farming system, concepts and components. | | CO1 | U | 5 |
| 28. | Explain aeroponics and hydroponics. | | CO2 | U | 5 |
| 29. | State the advantages of value addition. | | CO3 | R | 5 |
| 30. | Articulate the role of NABARD in commercial farming-based livelihood model. | | CO4 | A | 5 |
| 31. | Explain the objective and key features of e-NAM. | | CO5 | R | 5 |
| 32. | Elaborate green economy. | | CO5 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Brief the history of post-independence period of agriculture in India. | CO1 | R | 7 |
|  | b. | Enlist the types of IFS, Components and their advantages. | CO4 | An | 8 |
|  |  |  |  |  |  |
| 34. | a. | Define cropping system and its types. | CO2 | R | 8 |
|  | b. | Enumerate the livestock-based farming systems. | CO3 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain in detail about medium and large enterprises in farming. | CO3 | An | 8 |
|  | b. | Write down the general benefits of animal husbandry. | CO5 | R | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | *Evaluate*the existing Farming-Based Livelihoods to identify areas for improvement and  Sustainability. |
| **CO2** | *Recommend* Agricultural Practices and Systems to enhance productivity and sustainability. |
| **CO3** | *Perform*Sustainable Farming Strategies to achieve a better livelihood. |
| **CO4** | *Use* Agricultural Innovations and Technologies to improve productivity and efficiency. |
| **CO5** | *Develop*Entrepreneurial and Value-Addition Skills to enhance their agricultural businesses. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 14 | 7 | - | - | - | - | 21 |
| **CO2** | 10 | 12 | 1 | - | - | - | 23 |
| **CO3** | 12 | 9 | - | 8 | - | - | 29 |
| **CO4** | 2 | 7 | 5 | 8 | - | - | 22 |
| **CO5** | 30 | - | - | - | - | - | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **25AG103** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF SOIL SCIENCE** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Petrology | | CO1 | U | 1 |
| 2. | Give an example 2:1:1 type clay mineral | | CO1 | R | 1 |
| 3. | State the different agents of weathering | | CO1 | R | 1 |
| 4. | What is swelling chlorites? | | CO2 | R | 1 |
| 5. | What is the ideal soil texture that contains a balanced proportion of soil texture | | CO2 | An | 1 |
| 6. | What is Dokuchaiev established soil forming factors | | CO2 | A | 1 |
| 7. | Define isomorphous substitution | | CO3 | R | 1 |
| 8. | Distinguish ‘Podsolization’ from ‘Laterization’ | | CO3 | R | 1 |
| 9. | Define Illuviation | | CO3 | A | 1 |
| 10. | Who is known as the Father of Soil Science in India | | CO4 | A | 1 |
| 11. | Which soil order represents soils with weakly developed horizons | | CO4 | U | 1 |
| 12. | Which group of enzymes is responsible for breaking down cellulose | | CO4 | R | 1 |
| 13. | Classify the major fractions of humus | | CO5 | R | 1 |
| 14. | The process by which water enters into the soil surface is called | | CO5 | An | 1 |
| 15. | Which fertilizer containing both ammonium and nitrate forms of nitrogen | | CO6 | R | 1 |
| 16. | Name the 1:1 type clay mineral that has low swelling and shrinking properties | | CO6 | R | 1 |
| 17. | Cite type of clay mineral which has highest CEC. Mention the range of CEC | | CO6 | U | 1 |
| 18. | State the factors affecting soil organic matter | | CO1 | R | 1 |
| 19. | Define Cation exchange capacity | | CO2 | U | 1 |
| 20. | What is the common shape of soil aggregates that promotes good soil structure | | CO4 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Give a short note on physical classification of soil water | | CO1 | A | 5 |
| 22. | Explain Goldschmidt’s laws in detail. | | CO2 | U | 5 |
| 23. | List out any five epipedons and explain them | | CO3 | E | 5 |
| 24. | Elucidate the classification of phyllosilicates. | | CO4 | R | 5 |
| 25. | Write in detail about Surface chemistry of clay minerals. | | CO5 | An | 5 |
| 26. | List out the mechanisms of Gaseous exchange | | CO6 | A | 5 |
| 27. | Write about two group of soil forming factor | | CO1 | A | 5 |
| 28. | Define soil taxonomy. Explain the concept and importance of soil taxonomy in soil classification. | | CO2 | R | 5 |
| 29. | Write short notes on the **biological agencies involved in weathering of rocks.** | | CO3 | An | 5 |
| 30. | Explain about factors affecting soil colour | | CO4 | C | 5 |
| 31. | Define soil reaction. Explain the different **types of soil acidity** | | CO5 | A | 5 |
| 32. | Compare **ferromagnesian** and **non-ferromagnesian** silicate minerals with examples. | | CO6 | An | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the **formation of rocks** and classify them based on their origin with suitable examples. | CO1 | E | 8 |
|  | b. | Discuss the various p**edogenic processes** involved in soil formation. | CO6 | U | 7 |
|  |  |  |  |  |  |
| 34. | a. | Discuss the **scientific classification of Indian soils** as given by **ICAR**, and describe the major types of soils found in India. | CO2 | An | 8 |
|  | b. | **Write notes on the Clay minerals in different soil orders.** | CO4 | An | 7 |
|  |  |  |  |  |  |
| 35. | a. | Explain the **various factors influencing** physical weatheringof rocks. | CO3 | A | 8 |
|  | b. | **Write in detail about the clay-organic complexes** | CO5 | An | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Evaluate the soil for crop production based on soil formation |
| **CO2** | Evaluate the soil colloids for crop production |
| **CO3** | Recommend measures for improving crop productivity based on the physical properties of soil |
| **CO4** | Recommend measures for improving crop productivity based on the chemical properties of soil |
| **CO5** | Recommend land use planning based on soil classification |
| **CO6** | Develop skills in soil chemistry- silicate, clay mineral |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 2 | 11 | 1 | 7.5 | - | 22.5 |
| **CO2** | 5 | 6 | 1 | 8.5 | - | - | 20.5 |
| **CO3** | 2 | - | 8.5 | 5 | 5 | - | 20.5 |
| **CO4** | 8 | 1 | - | 7.5 | - | 5 | 21.5 |
| **CO5** | 1 | - | - | 18.5 |  |  | 19.5 |
| **CO6** | 2 | 7.5 | 10 | 1 | - | - | 20.5 |
|  | | | | | | | **125** |



**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **25AG106** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF HORTICULTURE** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Horticulture. | | CO1 | R | 1 |
| 2. | Differentiate ‘climacteric fruits’ from ‘non- climacteric fruits’ with an example. | | CO5 | U | 1 |
| 3. | List out the Fruits which are rich in vitamin A and C | | CO1 | R | 1 |
| 4. | Give the full form of IIHR and IIVR. | | CO1 | U | 1 |
| 5. | Write two examples each for ‘tropical fruits’ and ‘sub-tropical fruits’. | | CO1 | A | 1 |
| 6. | List out the pot mixtures which are used for propagation of nursery plants. | | CO2 | R | 1 |
| 7. | Define sexual propagation. | | CO2 | R | 1 |
| 8. | Define nursery. | | CO2 | R | 1 |
| 9. | Brief on hardwood cuttings with an example. | | CO2 | U | 1 |
| 10. | Define air layering. | | CO2 | R | 1 |
| 11. | Define HDP. | | CO4 | R | 1 |
| 12. | Brief on patch budding with suitable example. | | CO2 | U | 1 |
| 13. | Differentiate ‘open center’ from ‘central leader’ systems of training. | | CO3 | U | 1 |
| 14. | Define Embryo culture. | | CO2 | R | 1 |
| 15. | Write short note on Multistory Cropping System. | | CO4 | A | 1 |
| 16. | Write short note on truck gardens. | | CO4 | A | 1 |
| 17. | Explain the overhead irrigation. | | CO4 | A | 1 |
| 18. | Define Infertility. | | CO3 | R | 1 |
| 19. | Define maturity index. | | CO5 | R | 1 |
| 20. | Give the full form of IPNS and INM | | CO4 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Esplain the scope and importance of horticulture. | | CO1 | A | 5 |
| 22. | Classify the horticultural crops based on fruit morphology. | | CO1 | An | 5 |
| 23. | Write in details about horticultural zones and climatic requirements for important fruits of India. | | CO1 | A | 5 |
| 24. | Explain the different types of cuttings with suitable examples. | | CO2 | A | 5 |
| 25. | Discuss the role of auxin in horticulture crops. | | CO3 | U | 5 |
| 26. | Briefly describe the methods of weed control in orchards. | | CO4 | U | 5 |
| 27. | Explain the special types of pruning practices followed in horticulture crops. | | CO3 | A | 5 |
| 28. | Classify the types of seed dormancy. | | CO2 | An | 5 |
| 29. | Describe the merits and demerits of micro propagation. | | CO2 | R | 5 |
| 30. | Describe the principles and elements of landscape design with illustrate. | | CO1 | R | 5 |
| 31. | Classify the different systems of irrigation which are followed horticultural crops. | | CO4 | An | 5 |
| 32. | Discus the types of seed pelleting and their advantages. | | CO2 | U | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Write about branches of horticulture. | CO1 | A | 7 |
|  | b. | Write in details about organic farming. | CO4 | A | 8 |
|  |  |  |  |  |  |
| 34. | a. | Write in details about raising nursery seedlings in pro-tray. | CO2 | A | 8 |
|  | b. | Discuss details about types of Japanese garden. | CO1 | U | 7 |
|  |  |  |  |  |  |
| 35. | a. | Classify the vegetables based on cultural requirement and season of cultivation. | CO1 | An | 8 |
|  | b. | Explain the types of parks. | CO1 | A | 7 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | |  | | --- | | Relate the classification of Agro climatic zones with congeniality for production of horticultural crops | |
| **CO2** | |  | | --- | | Analyze the various factors of growth and development with production of horticultural crops | |
| **CO3** | |  | | --- | | Apply the concepts of layout of kitchen and nutritional garden | |
| **CO4** | |  | | --- | | Adopt propagation techniques for commercial nursery enterprises | |
| **CO5** | |  | | --- | | Apply the concepts of training, pruning, fruitset, and regulation of bearing in horticultural crops | |
| **CO6** | |  | | --- | | Demonstrate orchard establishment and management | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 7 | 8 | 25 | 13 | - | - | **53** |
| **CO2** | 10 | 7 | 13 | 5 | - | - | **35** |
| **CO3** | 1 | 6 | 5 | 0 | - | - | **12** |
| **CO4** | 1 | 6 | 11 | 5 | - | - | **23** |
| **CO5** | 1 | 1 | 0 | 0 | - | - | **2** |
| **CO6** |  |  |  |  |  |  |  |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **25AG109** | **Duration** | **3hrs** |
| **Course Name** | **COMMUNICATION SKILLS FOR PROFESSIONALS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Define Communication. | | CO2 | U | 1 |
| 2. | Define ‘Precise writing’. | | CO3 | R | 1 |
| 3. | Cite the observations and impressions of field diary. | | CO3 | U | 1 |
| 4. | Define Mind Mapping method. | | CO3 | R | 1 |
| 5. | Distinguish ‘skimming’ from ‘scanning’ | | CO3 | R | 1 |
| 6. | Compare ‘academic writing with ‘non-academic writing’ | | CO4 | R | 1 |
| 7. | Sketch a diagram of J. P. Leagans models of communication. | | CO4 | U | 1 |
| 8. | Define Supplementary reading. | | CO5 | U | 1 |
| 9. | Relate the Encoding with Decoding | | CO2 | R | 1 |
| 10. | Define Downward communication. | | CO1 | U | 1 |
| 11. | State about live reporting. | | CO2 | R | 1 |
| 12. | Explain about technical writing. | | CO2 | U | 1 |
| 13. | Distinguish the ‘foot notes’ from ‘citation’ | | CO3 | R | 1 |
| 14. | Interpret the characteristics of effective communication. | | CO1 | U | 1 |
| 15. | Cite the phrase ‘Curriculum Vitae (CV)’ | | CO2 | R | 1 |
| 16. | State the importance of self-confidence | | CO3 | R | 1 |
| 17. | Define Summary. | | CO3 | U | 1 |
| 18. | State the aspects of reading comprehensions. | | CO2 | R | 1 |
| 19. | Classify the different types of audience? | | CO5 | U | 1 |
| 20. | List out the components of writing process. | | CO3 | U | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Elaborate the details of types of communication. | | CO1 | R | 5 |
| 22. | Illustrate the details of barriers of communication. | | CO1 | R | 5 |
| 23. | Classify the different types of writing skills. | | CO5 | R | 5 |
| 24. | Describe the different aspects of bibliographic procedure. | | CO1 | U | 5 |
| 25. | List out the various types of abstracts. | | CO4 | R | 5 |
| 26. | Outline the don’ts of precise writing. | | CO3 | U | 5 |
| 27. | List out the characteristics of the individual presentation. | | CO5 | R | 5 |
| 28. | Interpret the points to be considered in making effective public speaking. | | CO3 | R | 5 |
| 29. | Examine the details of types of indexing. | | CO4 | U | 5 |
| 30. | Classify the do and don’t of the power point presentation? | | CO4 | U | 5 |
| 31. | Distinguish ‘individual presentation’ from ‘group presentation’ | | CO5 | U | 5 |
| 32. | Summarize the various types of active listening? | | CO2 | A | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | List out the different models of communication. | CO1 | A | 7.5 |
|  | b. | Examine the note making methods and its types. | CO2 | U | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Describe about oral presentation? Describe the 10 rules of effective oral presentation. | CO4 | A | 7.5 |
|  | b. | Relate the do’s with don’ts of abstract writing. | CO3 | U | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the various stages of group presentation. | CO5 | U | 7.5 |
|  | b. | Describe the steps in preparing individual presentation. | CO2 | R | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Formulate grammatically correct sentences in oral and written form. |
| **CO2** | Prepare various types of technical documents. |
| **CO3** | Demonstrate effective verbal and non-verbal communication skills. |
| **CO4** | Summarize various types of oral and textual information |
| **CO5** | Deliver prepared and impromptu speeches |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 10 | 7 | 7.5 | - | - | - | 24.5 |
| **CO2** | 11.5 | 9.5 | 5 | - | - | - | 26.0 |
| **CO3** | 9 | 16.5 | - | - | - | - | 25.5 |
| **CO4** | 11 | 6 | 7.5 | - | - | - | 24.5 |
| **CO5** | 10 | 14.5 | - | - | - | - | 24.5 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

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| --- | --- | --- | --- |
| **Course Code** | **25AG110** | **Duration** | **3hrs** |
| **Course Title** | **RURAL SOCIOLOGY AND EDUCATIONAL PSYCHOLOGY** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the study of human relationships in rural environment | | CO1 | U | 1 |
| 2. | Father of sociology is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | R | 1 |
| 3. | Basic unit of society is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO1 | An | 1 |
| 4. | A unit of two or more people in reciprocal communication is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | E | 1 |
| 5. | The group who has definite system of roles is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | U | 1 |
| 6. | Limited geographic areas in which the individuals and families are known to each and carry-on intimate association together is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO2 | R | 1 |
| 7. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the group which has permanent membership. | | CO3 | An | 1 |
| 8. | The group which consists of the members who are alike or similar in status in the class system of society is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO3 | An | 1 |
| 9. | The word caste is derived from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ language | | CO3 | R | 1 |
| 10. | The socially acceptable or unacceptable rules and guiding standards are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | U | 1 |
| 11. | The assimilation of culture of one group by another which modifies the existing culture is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO4 | An | 1 |
| 12. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the approved form of behaviour transmitted from tradition\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO4 | U | 1 |
| 13. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an example from formal social control | | CO5 | C | 1 |
| 14. | Alteration in the structure and function of society is called \_\_\_\_\_\_\_\_\_\_\_ | | CO5 | A | 1 |
| 15. | Third step in extension teaching is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | R | 1 |
| 16. | The person has been placed in between extrovert and introvert is called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | CO6 | An | 1 |
| 17. | Father of Psychology is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | CO6 | R | 1 |
| 18. | The society is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in nature | | CO1 | An | 1 |
| 19. | Labour union is an example for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ group | | CO2 | C | 1 |
| 20. | Culture is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ quality | | CO4 | E | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Difference between rural sociology and extension | | CO1 | An | 5 |
| 22. | Define society and describevarious patterns of rural settlement with examples | | CO2 | U | 5 |
| 23. | Define social control and elucidate different types of social control | | CO3 | E | 5 |
| 24. | Define ecological entity and explain different forms of ecological entities in rural society | | CO4 | R | 5 |
| 25. | Elucidate the scope and importance of educational psychology in agricultural extension. | | CO5 | C | 5 |
| 26. | Define extension education and explain the different steps in extension teaching methods | | CO6 | A | 5 |
| 27. | Write down the characteristics of Indian rural society | | CO1 | An | 5 |
| 28. | Explain different forms of social stratification | | CO2 | U | 5 |
| 29. | Describe the indicators or measures of social change | | CO3 | C | 5 |
| 30. | Describe the classification of customs with examples | | CO4 | A | 5 |
| 31. | Explain different factors influencing personality | | CO5 | E | 5 |
| 32. | Define learning and explain the principles of learning | | CO6 | R | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. | a. | Explain the difference between rural and urban society. | CO1 | U | 7.5 |
|  | b. | Define rural sociology and explain the scope of rural sociology in agricultural extension. | CO1 | C | 7.5 |
|  |  |  |  |  |  |
| 34. | a. | Define social institution and elucidate the various types of social institutions found in rural society. | CO2 | U | 10 |
|  | b. | Explain the various factors that contribute to social change. | CO2 | E | 5 |
|  |  |  |  |  |  |
| 35. | a. | Explain the various elements of learning situation. | CO3 | A | 7.5 |
|  | b. | Define personality and explain the different methods to assess the personality. | CO3 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | It gives understanding about the key concepts of rural sociology and their relevance to agricultural extension |
| **CO2** | Recognition of social groups, institutions and organization in rural development |
| **CO3** | Analyze social interaction, social change and their impact on agricultural extension work. |
| **CO4** | Apply basic concepts of psychology and educational psychology in extension programmes |
| **CO5** | Understand intelligence, personality for effective farmer education. |
| **CO6** | Develop skills to apply teaching–learning principles for technology transfer and farmer capacity building. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 8.5 | - | 12 | - | 7.5 | 29 |
| **CO2** | 1 | 21 | - | - | 6 | 1 | 29 |
| **CO3** | 1 |  | 7.5 | 9.5 | 5 | 5 | 28 |
| **CO4** | 5 | 2 | 5 | 1 | 1 | - | 14 |
| **CO5** | - | - | 1 | - | 5 | 6 | 12 |
| **CO6** | 7 | - | 5 | 1 | - | - | 13 |
|  | | | | | | | **125** |

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**END SEMESTER EXAMINATION – NOV / DEC 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **25AG112** | **Duration** | **3hrs** |
| **Course Title** | **INTRODUCTORY MATHEMATICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (20 X 1 = 20 MARKS)** | | | | | |
| 1. | Write arithmetic progression. | | CO1 | A | 1 |
| 2. | State the nth term of a Geometric Progression. | | CO1 | R | 1 |
| 3. | Compute the common difference of the AP: 5, 9, 13, 17... | | CO1 | A | 1 |
| 4. | Write 3 x 3 matrix. | | CO2 | A | 1 |
| 5. | Write the order of a matrix | | CO2 | A | 1 |
| 6. | State the formula for determinant of a 2 × 2 matrix. | | CO2 | R | 1 |
| 7. | Use first principle to define derivative | | CO3 | R | 1 |
| 8. | Differentiate y = x2 + 3x with respect to x. | | CO3 | An | 1 |
| 9. | Illustrate partial differentiation. | | CO3 | U | 1 |
| 10. | State integration by parts. | | CO4 | R | 1 |
| 11. | Integrate ∫ x dx. | | CO4 | An | 1 |
| 12. | State the formula for area under a curve. | | CO4 | R | 1 |
| 13. | Write a mathematical model. | | CO5 | A | 1 |
| 14. | Give an example of a linear model. | | CO5 | U | 1 |
| 15. | Write one application of exponential model. | | CO5 | A | 1 |
| 16. | Write the order of PT if P matrix is of order 2 x 3 | | CO3 | A | 1 |
| 17. | Write marginal cost. | | CO3 | A | 1 |
| 18. | Name the transpose of a matrix. | | CO2 | R | 1 |
| 19. | Write any two-integration formula. | | CO4 | A | 1 |
| 20. | State one advantage of mathematical modeling in agriculture. | | CO5 | R | 1 |
| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | | | |
| 21. | Calculate the sum of first 20 terms of an arithmetic progression whose first term is 5 and common difference is 3. | | CO1 | An | 5 |
| 22. | Determine the 8th term of a geometric progression whose first term is 2 and common ratio is 3. | | CO1 | An | 5 |
| 23. | Compute A-1 using adjoint method for A = | | CO2 | A | 5 |
| 24. | Evaluate determinant of the matrix using Cofactors | | CO2 | E | 5 |
| 25. | Differentiate y = (3x2 + 2x) (x + 5). | | CO3 | An | 5 |
| 26. | Determine the maxima and minima of y = x3 - 6x2 + 9x + 15. | | CO3 | A | 5 |
| 27. | Integrate ∫ (3x² + 5x) dx. | | CO4 | An | 5 |
| 28. | Evaluate ∫ sinx cosx dx by using substitution method. | | CO4 | E | 5 |
| 29. | Calculate a linear model y = a + bx to the data:   |  |  | | --- | --- | | x | 1, 2, 3, 4 | | y | 2, 4, 5, 7 | | | CO5 | An | 5 |
| 30. | Calculate an exponential model to the data:   |  |  | | --- | --- | | x | 1, 2, 3 | | y | 2.7,7.4, 20.1 | | | CO5 | An | 5 |
| 31. | Mention the applications of differentiation in determining marginal cost and marginal revenue. | | CO3 | E | 5 |
| 32. | Outline classification of mathematical models in agricultural systems. | | CO5 | E | 5 |
| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | | |
| 33. |  | Determine the inverse of the matrix using adjoint methods | CO2 | A | 15 |
|  |  |  |  |  |  |
| 34. | a. | Evaluate the formula for the sum of n terms of an Arithmetic Progression (AP). | CO1 | E | 7.5 |
|  | b. | Compute the three terms of an AP whose sum of the first three terms is 27 and the product of the first and third term is 182. | CO1 | A | 7.5 |
|  |  |  |  |  |  |
| 35. | a. | Evaluate) dx and find the area under the curve. | CO5 | E | 7.5 |
|  | b. | Calculate a quadratic model to the data:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | | y | 2 | 6 | 12 | 20. | | CO5 | An | 7.5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Recommend relevant mathematical sequences and series for crop yield prediction and financial planning. |
| **CO2** | Optimize resources using different types of matrices-based input–output analysis. |
| **CO3** | Predict crop yield with suitable differentiation methods. |
| **CO4** | Estimate land use, crop growth rate, cost and area in agriculture using calculus. |
| **CO5** | Design field trials using mathematical models under varying conditions. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | - | 2 | 10 | 15 | - | **28** |
| **CO2** | 2 | - | 22 | - | 5 | - | **29** |
| **CO3** | 1 | 1 | 7 | 6 | 5 | - | **20** |
| **CO4** | 2 | - | 1 | 6 | 5 | - | **14** |
| **CO5** | 1 | 1 | 2 | 10 | 20 | - | **34** |
|  | | | | | | | **125** |