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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2002** | **Duration** | **3hrs** |
| **Course Title** | **PROBLEM SOLVING USING PROGRAMMING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | List the different types of Errors and explain. | CO1 | R | 10 |
|  | b. | Examine the various data types in C. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Summarize the various types of C operators. | CO2 | U | 10 |
|  | b. | Explain in detail about variables, constants and its types used in C. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Show the differences between while and do-while statements in C with suitable examples. | CO3 | U | 10 |
|  | b. | Differentiate between a switch and a nested-if statement. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Develop a C program that uses string handling functions of concatenate two strings, copy one string into another and compare two strings. | CO4 | C | 15 |
|  | b. | List the advantages of using an Array. | CO4 | R | 5 |
|  |  |  |  |  |  |
| 5. | a. | Explain the declaration and initialization of one dimensional and two-dimensional array with an example. | CO5 | U | 10 |
|  | b. | Write a C Program to implement string copy operation STRCOPY(str1,str2) | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Develop a C program using arithmetic, comparison and logical operators. | CO1 | C | 10 |
|  | b. | Write a C program to find the factorial of a number using do-while, where the number n is entered by user. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Develop a program that reads a sentence and reverses the order of words using string manipulation functions. | CO4 | C | 10 |
|  | b. | Construct a C program to demonstrate the usage of Enumerated Data Type. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain in detail about Pass by Value and Pass by reference. | CO6 | U | 10 |
|  | b. | Write a C program using structures to prepare the students mark statement. | CO6 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe about the functions and structures. | CO6 | R | 10 |
|  | b. | Define Union. Describe how to declare, initialize and access members of Union with a programming example. | CO6 | R | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | illustrate the basics of computers and programming language. |
| CO2 | summarize about character sets and data types. |
| CO3 | apply control structures in programming. |
| CO4 | develop C programs to solve computational problems using functions. |
| CO5 | construct C programs using arrays and strings. |
| CO6 | develop C programs for solving problems using structures and union. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 |  | 10 |  |  | 10 | 30 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 |  | 20 | 10 |  |  |  | 30 |
| CO4 | 5 |  |  |  |  | 25 | 30 |
| CO5 |  | 10 | 20 |  |  |  | 30 |
| CO6 | 20 | 10 | 10 |  |  |  | 40 |
|  | | | | | | | **180** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2004** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF INFORMATION TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain in detail about error detection codes. | CO1 | U | 10 |
|  | b. | Describe representation of characters in computer. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the principles of image compression and image storage formats. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Describe in detail about video compression standard. | CO2 | U | 10 |
|  | b. | Justify the concept behind storage cells and its types. | CO2 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Analyze about the working principles of few output devices with neat diagram. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | State the concept of DBMS and uses of spreadsheets. | CO4 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | What are page description and markup languages? Explain. | CO5 | R | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain all about multimedia data processing. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Illustrate in detail the significance of privacy, security, and integrity of information. | CO6 | R | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. |  | Analyze in detail about the careers in information technology. | CO6 | A | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the different types of data. |
| CO2 | Understand data storage in the computer. |
| CO3 | Develop knowledge about the CPU, networks and output devices. |
| CO4 | Understand the database concepts. |
| CO5 | Acquire knowledge about data processing and the Internet. |
| CO6 | Learn about applying IT techniques for societal impact. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / BL | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 10 | 30 |  |  |  |  | 40 |
| CO2 |  | 10 |  |  | 10 |  | 20 |
| CO3 |  |  |  | 20 |  |  | 20 |
| CO4 | 20 |  |  |  |  |  | 20 |
| CO5 | 40 | 20 |  |  |  |  | 60 |
| CO6 |  |  |  | 20 |  |  | 20 |
|  | | | | | | | **180** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2006** | **Duration** | **3hrs** |
| **Course Title** | **FOUNDATIONS OF DATA SCIENCE AND ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Represent the important concepts of data science using a Venn diagram and explain the significance of the concepts and core areas a data scientist should be familiar with. Justify your statements with suitable examples. | CO1 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Compare and contrast probabilistic models with statistical models. Explain how each of these models can be effective in solving problems with appropriate examples. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. |  | Explain the five steps of the data science process and illustrate how a data scientist can apply a pragmatic approach to solving real-world problems. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Explain the four levels of measurement (nominal, ordinal, interval, and ratio). Illustrate each level with real-world examples, emphasizing the unique characteristics of each. | CO2 | An | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain the process of exploring a dataset using Pandas functions. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Analyze the impact of a confounding variable on the relationship between correlation and causation, providing a relevant example. | CO3 | A | 10 |
|  | b. | Analyze the role of probability and statistics in machine learning algorithms. | CO3 | An | 10 |
|  |  |  |  |  |  |
| 7. |  | Explain the different types of graphs for visualizing data. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain the role of the different types of datasets in machine learning. | CO5 | An | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Illustrate the latest developments in machine learning and provide real-world examples of their applications. | CO6 | A | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics of data science. |
| CO2 | Categorize data and process them. |
| CO3 | Identify the mathematical foundations of data science. |
| CO4 | Inspect the role of probability and statistics in data analytics. |
| CO5 | Formulate the fundamentals of machine learning techniques in data exploration. |
| CO6 | Apply data analytics to real-world problems. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  | 40 |  |  |  | 40 |
| CO2 |  |  |  | 40 |  |  | 40 |
| CO3 |  | 20 | 10 | 10 |  |  | 40 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 |  |  |  | 20 |  |  | 20 |
| CO6 |  |  | 20 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2008** | **Duration** | **3hrs** |
| **Course Title** | **ESSENTIALS OF PYTHON PROGRAMMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Summarize the rules for declaring a variable. | CO1 | U | 8 |
|  | b. | Construct a program to calculate salary of an employee given his basic pay, HRA =10 percent of basic pay, TA=5 percent of basic pay. Use them to calculate the salary of the employee. | CO1 | A | 12 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | List the types of comments used in python programming. | CO1 | R | 5 |
|  | b. | Explain about arithmetic, relational and membership operators with suitable example. | CO1 | U | 15 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate about looping control statements with sample code. | CO2 | A | 15 |
|  | b. | Compare break and continue statements. | CO2 | U | 5 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Construct a program to print sum of odd numbers between 1 to 50. | CO2 | U | 8 |
|  | b. | Illustrate the different forms of conditional statements with suitable example. | CO2 | A | 12 |
|  |  |  |  |  |  |
| 5. | a. | Construct a program to calculate the area of a triangle using function. | CO3 | A | 10 |
|  | b. | Summarize about recursion with example. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Compare local and global variables using a sample code. | CO3 | U | 8 |
|  | b. | Explain the types of parameters passing with suitable example. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 7. | a. | Describe any ten methods used in list with suitable example. | CO4 | U | 10 |
|  | b. | Construct a program that displays the details of a cricket player. The details must include his *name, match\_played, run\_rate, and wickets\_taken* using class and objects | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Summarize about dictionary with suitable example. | CO4 | U | 10 |
|  | b. | Explain the types of widgets used in creating GUI. | CO6 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain inheritance with examples. | CO5 | A | 10 |
|  | b. | Explain about file handling concepts with examples. | CO6 | A | 10 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | summarize the basics about python programming. |
| CO2 | demonstrate the use of control flow statements in python. |
| CO3 | develop modules for reusability of code. |
| CO4 | infer the concept of collections in python. |
| CO5 | illustrate object-oriented concepts. |
| CO6 | make use of file handling concepts. |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / BL | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 5 | 23 | 12 |  |  |  | 40 |
| CO2 |  | 13 | 27 |  |  |  | 40 |
| CO3 |  | 18 | 22 |  |  |  | 40 |
| CO4 |  | 20 | 10 |  |  |  | 30 |
| CO5 |  |  | 20 |  |  |  | 20 |
| CO6 |  |  | 10 |  |  |  | 10 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2012** | **Duration** | **3hrs** |
| **Course Title** | **DATA STRUCTURES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe operations on Arrays. | CO1 | R | 10 |
|  | b. | Discuss Time and Space Complexity in detail. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Write a program for circular Linked Lists. | CO2 | A | 10 |
|  | b. | Summarize doubly Linked Lists. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Design a C program for Queues using arrays. | CO3 | C | 10 |
|  | b. | Explain push() and pop() functions in Stacks using Single linked list. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate the concept of Merge sort with example. | CO4 | U | 10 |
|  | b. | Identify the difference between binary search and linear search. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Convert following Infix expression into Postfix expression using Tabular  method.  a – b / c \* d + e \* f / g | CO5 | U | 10 |
|  | b. | Construct a Binary Search tree using the elements 14,25,51,12,21,45,11,10 | CO5 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Write an algorithm for insertion of a new node as last node in Doubly linked list. | CO2 | A | 10 |
|  | b. | Write a C program to implement the Singly Linked List. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Classify the different types of Trees. | CO5 | An | 10 |
|  | b. | Explain quick sort algorithm with the help of an example. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Examine the representation of graph with examples. | CO6 | R | 10 |
|  | b. | Describe a method to declare and initialize one dimensional & two-dimensional arrays? | CO1 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss following with reference to graphs.  (i) Directed graph (ii) Undirected graph (iii) Degree of vertex (iv)Null graph (v) Acyclic Graph | CO6 | U | 10 |
|  | b. | Distinguish between BFS and DFS. | CO6 | U | 10 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Outline the different ways of arranging and handling collection of data. |
| CO2 | organize data in arrays and perform operations |
| CO3 | organize and manipulate data using linked lists. |
| CO4 | organize and manipulate data using stacks and queues. |
| CO5 | understand searching and sorting techniques. |
| CO6 | organize and manipulate data in trees and graphs. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 10 |  |  |  |  | 30 |
| CO2 |  | 10 | 20 |  |  |  | 30 |
| CO3 |  | 10 | 10 |  |  | 10 | 30 |
| CO4 | 10 | 10 | 10 |  |  |  | 30 |
| CO5 |  | 10 |  | 10 |  | 10 | 30 |
| CO6 | 10 | 20 |  |  |  |  | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2014** | **Duration** | **3hrs** |
| **Course Title** | **DATABASE MANAGEMENT SYSTEM** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Explain the various applications of database and it’s user details. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Describe the database architecture in detail. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Paraphrase the following relational algebra operations with suitable example.   1. Selection 2. Projection 3. Union 4. Set Difference 5. Set Intersection | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Demonstrate the E-R model for student information system and also explain the different E-R model notations in detail. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain the various types of normalization in detail. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Describe the locking mechanism in detail. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Develop following queries for employee details.   1. Create table 2. Drop table 3. Alter table 4. Truncate table 5. Rename table | CO5 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Design queries for hotel management system using data manipulation language. | CO5 | C | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Summarize about stored procedures with suitable examples. | CO6 | U | 10 |
|  | b. | Demonstrate about cursor. | CO6 | A | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Evaluate business information problem and find the requirements of a problem in terms of data. |
| CO2 | Summarize about database schema and need for normalization. |
| CO3 | Design the database schema with the use of appropriate data types for storage of data in database. |
| CO4 | Use different types of physical implementation of database. |
| CO5 | Construct simple and moderately advanced database queries using Structured Query Language (SQL). |
| CO6 | Facilitate students to understand the concept of triggers. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 40 |  |  |  |  | 40 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 |  | 20 | 20 |  |  |  | 40 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 |  |  |  |  |  | 40 | 40 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2017** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF BUSINESS ANALYTICS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Differentiate between Layout-led Discovery and Data-led Discovery, and analyze their respective advantages and disadvantages through relevant examples. | CO1 | An | 10 |
|  | b. | Evaluate the different types of Business Intelligence solutions and justify which solutions are most suitable for specific business needs. | CO1 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Examine how Business Intelligence can be utilized at different levels of effective decision making and analyze its role in improving strategic, tactical, and operational decisions. | CO1 | An | 20 |
|  |  |  |  |  |  |
| 3. | a. | Critically evaluate the different sources of semi-structured data and assess their impact on business intelligence and decision-making processes. | CO2 | E | 10 |
|  | b. | Illustrate the operation of Online Analytical Processing systems on multi-dimensional data with relevant examples from various business scenarios. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Analyze the differences between Online Transaction Processing systems and Online Analytical Processing systems. | CO2 | An | 10 |
|  | b. | Illustrate the different types of queries that an Online Transaction Processing system can process by providing relevant examples from various business applications. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 5. |  | Explain in detail the Business Intelligence (BI) framework with suitable examples, highlighting its key components and their functions. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Analyze the need for a data warehouse in a university that has many centers within India, and discuss how it can improve data integration and decision-making processes. | CO3 | An | 10 |
|  | b. | Illustrate the various stages in the Extract, Transform, and Load process in data integration scenarios and highlight their practical applications. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Discuss in detail when and how to conduct Data Profiling. | CO4 | U | 10 |
|  | b. | Illustrate the conceptual data model for a software development company. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | The entities of a software development company are given below:  *Business Units, BU Head, Employee, Address, Project,*  *Client.*  Design an entity relationship model for the company. | CO4 | C | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the need for a fact-based decision-making system and the usage of Key Performance Indicators. | CO5 | An | 10 |
|  | b. | Evaluate the common perspectives of reporting that apply at various levels of the enterprise, assessing their effectiveness in supporting strategic, tactical, and operational decisions. | CO6 | E | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Construct an end-to-end data warehousing solution for business intelligence involving various data sources, ETL, multidimensional modeling, OLAP, reporting, and analytics. |
| CO2 | Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence. |
| CO3 | Demonstrate the technology and processes associated with the Business Intelligence framework. |
| CO4 | Apply the BI process across the organization and make predictive analytics. |
| CO5 | Identify the metrics, indicators and make recommendations to achieve the business goal for a given business scenario. |
| CO6 | Apply BI process into daily management activities with reporting. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | - | - | 30 | 10 | - | 40 |
| CO2 | - | - | 20 | 10 | 10 | - | 40 |
| CO3 | - | 20 | 10 | 10 | - | - | 40 |
| CO4 | - | 10 | 10 | - | - | 20 | 40 |
| CO5 | - | - | - | 10 | - | - | 10 |
| CO6 | - | - | - | - | 10 | - | 10 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2018** | **Duration** | **3hrs** |
| **Course Title** | **BIG DATA ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the key characteristics of Big Data with suitable example. | CO1 | R | 10 |
|  | b. | Explain the classification of digital data with suitable example. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the following terminology of Big Data.   1. In-Memory Analytics 2. In-Database processing 3. Symmetric Multi-processor system 4. Massively parallel processing 5. Shared nothing architecture 6. CAP Theorem | CO2 | R | 10 |
|  | b. | Analyze the key challenges in Big Data based on data processing and data analysis. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Differentiate between HBase and Hadoop. | CO3 | An | 10 |
|  | b. | Explain the origins of Hadoop and describe how it evolved over time. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Infer the operations available in MongoDB Query Language to query documents based on a condition. | CO4 | An | 10 |
|  | b. | Describe the main terminologies used in MongoDB with examples. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Analyze the role of each component in the Mapper and how they contribute to data processing. | CO5 | An | 10 |
|  | b. | Discuss the step-by-step workflow of the Reducer phase in MapReduce and explain the concepts of the Reducer. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain how clustering techniques are applied in real-time dataset. | CO6 | A | 10 |
|  | b. | Write a Hive query using the SELECT statement to retrieve specific columns from a table. | CO6 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate how to choose a Hadoop distribution based on business requirements. | CO3 | A | 10 |
|  | b. | Explain the working of a combiner in MapReduce programming and list its advantages. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe GROUP BY clause using Hive query with example. | CO6 | R | 10 |
|  | b. | Describe the evolution of Big Data and its challenges. | CO1 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Summarize the Query Language of MongoDB with example. | CO4 | U | 10 |
|  | b. | Analyze the different types of joins in Hive. | CO6 | An | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Understand the fundamentals of Big Data. |
| CO2 | Understand the concepts of Hadoop. |
| CO3 | Develop solutions to problems using Big Data. |
| CO4 | Acquire knowledge about MongoDB. |
| CO5 | Apply Big Data to solve real world problems. |
| CO6 | Illustrate the role of map reduce programming in various scenarios. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 10 |  |  |  |  | 30 |
| CO2 | 10 |  |  | 10 |  |  | 20 |
| CO3 |  | 10 | 10 | 10 |  |  | 30 |
| CO4 |  | 20 |  | 10 |  |  | 30 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 | 10 |  | 20 | 10 |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2020** | **Duration** | **3hrs** |
| **Course Title** | **DATA MINING AND DATA WAREHOUSING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Illustrate the various applications of data mining with suitable example. | CO1 | U | 10 |
|  | b. | Explain the four main techniques used in data mining. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Determine how to handle missing data in a dataset as part of the data cleaning process. Provide a specific example. | CO2 | A | 10 |
|  | b. | Analyze the advantages and disadvantages of decision tree methods. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the desired features of clustering. | CO3 | R | 10 |
|  | b. | Explain the main categories of clustering methods. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Sketch the Multidimensional OLAP Architecture and explain the Multi-dimensional View of Data. | CO6 | A | 10 |
|  | b. | Express the key features of OLAP and define each feature briefly. | CO6 | C | 10 |
|  |  |  |  |  |  |
| 5. | a. | Analyze the roles of confidence and lift in association rule mining. | CO4 | An | 10 |
|  | b | Analyze the working performance of the naive algorithm for finding association rules in large datasets. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe the working process of OLAP cube and identify the advantages and disadvantages of ROLAP. | CO6 | U | 10 |
|  | b. | Describe the architecture of an Operational Data Store and explain its key components. | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the characteristics and disadvantages of using a star schema in data warehousing. | CO5 | A | 10 |
|  | b. | Analyze the differences among Star, Snowflake and Fact Constellation Schemas. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Calculate the Manhattan and Chebyshev distances between the following data points: (x1, y1) and (x2, y2). | CO3 | A | 10 |
|  | b. | Describe the different ways to store a transaction in a database. | CO4 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Categorize the types of OLAP and the key characteristics. | CO6 | An | 10 |
|  | b. | Apply Naïve Bayes method in real-time dataset and explain. | CO2 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | summarize the need for Data Mining. |
| CO2 | acquire knowledge on Data Preprocessing and Classification techniques. |
| CO3 | infer the concept of Clustering. |
| CO4 | explore the concepts of Association Mining. |
| CO5 | understand the need for Data Warehousing. |
| CO6 | infer the role of Online Analytical Processing. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  |  |  |  | 20 |
| CO2 |  |  | 20 | 10 |  |  | 30 |
| CO3 | 10 | 10 | 10 |  |  |  | 30 |
| CO4 | 10 |  |  | 20 |  |  | 30 |
| CO5 |  | 10 | 10 | 10 |  |  | 30 |
| CO6 |  | 10 | 10 | 10 |  | 10 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2021** | **Duration** | **3hrs** |
| **Course Title** | **DATA ANALYSIS AND VISUALIZATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Evaluate the significance of data visualization as both an art and a science in transforming complex datasets into meaningful insights. | CO1 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Evaluate the use of advanced Excel techniques, such as Data Bars, Sparklines, Box Plots, Mapping, and Bullet Charts, in enhancing data visualization and analysis. | CO2 | E | 20 |
|  |  |  |  |  |  |
| 3. |  | Analyze the characteristics and uses of various types of geospatial maps. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Explain the significance of using custom color palettes in Tableau and describe the types available. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 5. |  | Analyze the techniques and tools involved in data wrangling. | CO5 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the process and steps involved in creating a dashboard. | CO1 | U | 10 |
|  | b. | Analyze Shaffer’s 4 C’s of Data Visualization and provide examples to illustrate the impact of each principle. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Tabulate the differences between dashboard and storyboard. | CO3 | R | 10 |
|  | b. | Describe the key advantages of integrating R with various data analytics tools. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Describe the key steps involved in preparing data for analysis in Tableau. | CO6 | R | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Determine how to create a tree map in Tableau to visualize sales and profit data. | CO6 | A | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Collect and process data, create an interactive visualization, and use it to demonstrate or provide  insight into a problem, situation, or phenomenon. |
| CO2 | Employ best practices in data visualization to develop charts, maps, tables, and other visual representations of data. |
| CO3 | Summarize the basic knowledge needed to critique various visualizations (good and bad), and to identify design principles that make good visualizations effective using tableau. |
| CO4 | Illustrate the basic understanding of some of the challenges present in making data understandable across a wide range of potential audiences. |
| CO5 | Create compelling, interactive dashboards to combine several visualizations into a cohesive and functional whole. |
| CO6 | Demonstrate their own skills in identifying a visualization that can be improved, completing their own design and/or analysis on the underlying data, and working to publish or promote acceptance of their presentation. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 |  |  | 20 |  | 30 |
| CO2 |  |  |  | 10 | 20 |  | 30 |
| CO3 | 10 |  |  | 20 |  |  | 30 |
| CO4 |  | 30 |  |  |  |  | 30 |
| CO5 |  |  |  | 20 |  |  | 20 |
| CO6 | 20 |  | 20 |  |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2023** | **Duration** | **3hrs** |
| **Course Title** | **MACHINE LEARNING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | List and describe the various applications of machine learning. | CO1 | R | 15 |
|  | b. | Design a graph for classification and explain. | CO1 | C | 5 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Construct the customer interest recommendation system using machine learning techniques for shopping mall. | CO1 | C | 20 |
|  |  |  |  |  |  |
| 3. |  | Examine the basic concepts of classification and classify the below data using decision tree induction. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Compare the logistic regression and linear regression with suitable  example. | CO3 | An | 15 |
|  | b. | Classify the linear regression curve using the given data. Identify the  outlier and circle the points.  x y  2 5  4 10  6 18  8 20  10 25 | CO3 | An | 5 |
|  |  |  |  |  |  |
| 5. | a. | Explain the support vector machines with suitable example. | CO3 | U | 12 |
|  | b. | Describe the functions of NumPy library. | CO4 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Discuss the SMO algorithm in detail. | CO4 | U | 10 |
|  | b. | Discuss the weighted linear regression in detail. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. |  | Solve the below data and find the frequent item set using FP tree algorithm.  Lightbox | CO5 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Discuss the apriori algorithm in detail. | CO5 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe the Principal Component Analysis. | CO6 | U | 10 |
|  | b. | Write a python program to implement singular value decomposition and discuss its applications. | CO6 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Define the terminologies of Machine learning. |
| CO2 | Describe the concepts of Naïve Bayes theory and decision trees. |
| CO3 | Apply the algorithm of Support vector machines and Logistic regression in the real time problems. |
| CO4 | Analyze the regression models. |
| CO5 | Design unsupervised Learning algorithms using k-means clustering and Association analysis. |
| CO6 | Modify the data using principal component and singular value decomposition. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 15 |  |  |  |  | 25 | 40 |
| CO2 |  |  |  | 20 |  |  | 20 |
| CO3 |  | 12 |  | 20 |  |  | 32 |
| CO4 |  | 28 |  |  |  |  | 28 |
| CO5 |  | 20 | 20 |  |  |  | 40 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2027** | **Duration** | **3hrs** |
| **Course Title** | **PROFESSIONAL ETHICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Analyze and explain the key components of emotional intelligence and its importance in professional ethics. | CO1 | An | 10 |
|  | b. | Illustrate importance of value education in professional ethics. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the key elements of governing ethics. | CO1 | U | 10 |
|  | b. | Discuss the attributes of a professional with examples. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe Gilligan’s ethics of care and Rest’s four-component model of moral behavior. | CO2 | R | 10 |
|  | b. | Explain social learning theory with its key concepts and applications. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the influence of religion in ethical behavior with examples. | CO2 | R | 10 |
|  | b. | Discuss any 2 case studies of corporate social responsibilities. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain war ethics with its theories and modern challenges. | CO4 | U | 10 |
|  | b. | Illustrate the key areas where bioethics intersects with professional ethics. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Enumerate the importance of ethics in research with examples. | CO4 | R | 10 |
|  | b. | Illustrate the implementation of code of ethics with its limitations. | CO5 | A | 10 |
|  |  |  |  |  |  |
| 7. |  | Summarize the rights and responsibilities of a professional as a citizen. | CO3 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the ethics profile of an organization. | CO5 | R | 10 |
|  | b. | Explain the considerations for ethics audit. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe the setting and pursuing of life goals aligned with ethical living. | CO6 | R | 10 |
|  | b. | List and explain challenges in upholding human values and value degeneration. | CO6 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics of ethics and values. |
| CO2 | Solve professional problems using ethical codes. |
| CO3 | Analyze ethical codes and audit. |
| CO4 | Organize the life supporting ethics. |
| CO5 | Apply attitudes in the various situations of personal life. |
| CO6 | Illustrate the importance of the ethical standards in day-to-day lives. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | 10 | 10 | - | - | 30 |
| CO2 | 20 | 10 | - | - | - | - | 30 |
| CO3 | - | 10 | - | - | 20 | - | 30 |
| CO4 | 10 | 20 | 10 | - | - | - | 40 |
| CO5 | 10 | 10 | 10 | - | - | - | 30 |
| CO6 | 10 | 10 | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2029** | **Duration** | **3hrs** |
| **Course Title** | **ARTIFICIAL INTELLIGENE FOR DATA SCIENCE** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the four approaches of AI with suitable examples. | CO1 | R | 10 |
|  | b. | Explain the five foundational disciplines of AI, emphasizing how each contributes to the design and advancement of intelligent systems. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Apply the concept of A\* search algorithm to a real-world problem, such as route optimization in GPS systems. | CO2 | A | 10 |
|  | b. | Analyze the strengths and weaknesses of Depth-First Search (DFS) and BFS in solving problems like mazes or puzzles. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Evaluate the impact of pruning on decision trees and how does pruning prevent overfitting. | CO3 | E | 10 |
|  | b. | Explain an Artificial Neural Network Algorithm with example. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Apply logical formulation techniques to a real-world classification problem, such as spam email detection. | CO4 | A | 10 |
|  | b. | Explain the difference between supervised learning and reinforcement learning. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Apply a named entity recognition (NER) model to extract entities (such as person names, locations, and dates) from news articles. | CO5 | A | 10 |
|  | b. | List and describe the main types of machine translation systems, including rule-based, statistical, and neural machine translation. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the process of machine translation. How do translation models process and translate input text from a source language to a target language? | CO5 | U | 10 |
|  | b. | Apply a basic speech recognition model to transcribe a short audio clip. | CO5 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Analyze the difference between bagging and boosting techniques in ensemble learning. | CO3 | An | 10 |
|  | b. | Analyze the impact of different distance metrics (e.g., Euclidean, Manhattan, Minkowski) on the performance of the KNN algorithm. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Apply the principles of robotic hardware design to design a simple mobile robot. Discuss the choice of sensors (e.g., ultrasonic, infrared) and actuators (e.g., motors) to achieve basic navigation tasks. | CO6 | A | 10 |
|  | b. | Explain the role of middleware in robotic software architecture. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe the steps involved in training an object detection model in images and evaluate its performance. | CO6 | E | 10 |
|  | b. | List and explain the basic steps involved in an image processing pipeline, including image acquisition, preprocessing, enhancement, segmentation, and post-processing. | CO6 | A | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Relate Artificial Intelligence to Natural Intelligence |
| CO2 | Summarize Problem Solving Techniques in games |
| CO3 | Examine different forms of learning from nature |
| CO4 | Utilize logic-based reasoning and learning. |
| CO5 | Discover the role of Artificial intelligence in natural languages. |
| CO6 | Inspect the applications of Artificial Intelligence in Diverse Fields |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 |  |  |  |  | 20 |
| CO2 |  |  | 10 | 10 |  |  | 20 |
| CO3 |  | 10 |  | 20 | 10 |  | 40 |
| CO4 |  | 10 | 10 |  |  |  | 20 |
| CO5 | 10 | 10 | 20 |  |  |  | 40 |
| CO6 |  | 10 | 20 |  | 10 |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2031** | **Duration** | **3hrs** |
| **Course Title** | **CYBER CRIMES AND CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Classify the types of cyber criminals and the tools used by them. | CO1 | U | 10 |
|  | b. | Explain in detail about the strategies to prevent cyber-crimes. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the crimes associated with mobile communication devices. | CO1 | R | 10 |
|  | b. | Discuss how cyber-crimes against properties can be prevented. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain how cyber-crimes can be used against nation. | CO2 | U | 10 |
|  | b. | Differentiate deep web and dark web and list its challenges. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Explain in detail about data manipulation and web encroachment with example. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 5. |  | Describe symmetric key encryption and public key encryption with suitable example. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Explain what phishing is and describe its various types, such as spear phishing, whaling, and smishing. Provide examples of how each type is executed in real-world scenarios. | CO5 | U | 20 |
|  |  |  |  |  |  |
| 7. | . | Classify the different types of tunneling techniques used in network communications, such as GRE, IPsec, and SSH tunneling. Provide examples of where each technique might be applied. | CO5 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the vulnerabilities in DNS and how can it be exploited. | CO4 | U | 10 |
|  | b. | Discuss about Neo traditional crimes with example. | CO3 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Explain the various techniques used in social engineering, such as phishing, pretexting, and baiting, exploit psychological principles like trust, authority, or urgency to manipulate individuals. | CO6 | A | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Categorize the changes in society associated with the advent of technological changes and the  introduction of the Internet |
| CO2 | explain computer-related crime. |
| CO3 | develop a working knowledge of the classifications of motive for modern computer intruders and  how they relate to each other in the digital security realm. |
| CO4 | discuss the basic concepts of cryptographic technology and the major mathematical principles used  by cryptographic systems. |
| CO5 | describe the risks posed by the various types of malicious code objects and develop adequate  countermeasures to protect the systems. |
| CO6 | access and mitigate vulnerabilities. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2033** | **Duration** | **3hrs** |
| **Course Name** | **CYBER FORENSICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the various phases in cyber forensics investigation process with neat diagram. | CO1 | R | 15 |
|  | b. | Define Forensic Science? Write about fields in Forensic Science. | CO1 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Summarize the fundamental principles of Cyber Forensics. | CO2 | U | 5 |
|  | b. | Summarize various files and file systems that are used to store data in computer drives. | CO2 | R | 15 |
|  |  |  |  |  |  |
| 3. | a. | Correlate the following key terms  A) Sector B) Cluster C) Slack Space D) Lost Cluster  E) Bad Sector F) MBR G) Nibble | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate various forms of data hiding such as Disk cleaning utilities, File wiping utilities and Disk degaussing. | CO4 | An | 10 |
|  | b. | Relate the various methods recommended by NIST in physical destruction of disk. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss various Operating System utilities. List all the listening ports. | CO5 | U | 15 |
|  | b. | Sketch a way to capture Direct Evidence of Crimes. | CO5 | An | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe about four types of partitions. Write notes on Net stat, Net session and open files. | CO2 | R | 10 |
|  | b. | Examine the cache maintained by Browsers (Chrome and Mozilla) and list out the forensic importance of it. | CO1 | E | 10 |
|  |  |  |  |  |  |
| 7. | a. | Correlate the various things which you observe by viewing packets using Wireshark. | CO3 | C | 8 |
|  | b. | Defend the need of authentication, and correlate the three types of authentication. | CO3 | E | 12 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the various terms used in wireless networks. | CO6 | R | 8 |
|  | b. | Sketch and explain about various web site attacks that happen in websites. | CO6 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Relate and list out 4 different port numbers and its functions. | CO6 | C | 5 |
|  | b. | Develop a way by which imaging can be done from original drive and prove its integrity. | CO6 | E | 15 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | describe cyber forensics and the knowledge required to do the forensic analysis |
| CO2 | extend Scientific approaches to forensics that helps to identify, classify, locate and recover the evidence |
| CO3 | choose and apply current cyber forensics tools. |
| CO4 | devise basic network forensic analysis |
| CO5 | identify the emerging forensic technology |
| CO6 | show the required knowledge and expertise to become a proficient forensic investigator |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 20 |  |  |  | 10 |  | 30 |
| CO2 | 25 | 5 |  |  |  |  | 30 |
| CO3 |  |  |  | 20 | 12 | 8 | 40 |
| CO4 |  |  | 10 | 10 |  |  | 20 |
| CO5 |  | 15 |  | 5 |  |  | 20 |
| CO6 | 8 |  | 12 |  | 15 | 5 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2035** | **Duration** | **3hrs** |
| **Course Title** | **COMPUTER NETWORKS AND NETWORK SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Summarize the concept of open system interconnection with suitable diagrams. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Compare the different types of firewalls. | CO1 | An | 20 |
|  |  |  |  |  |  |
| 3. |  | Enumerate the working principles of EIGRP and OSPF in detail. | CO2 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Illustrate the working principles of the internet and transport layer protocols. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain different WAN terminologies and DNS lookup operations in detail. | CO4 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Illustrate the working principles of NAT and DHCP. | CO5 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Differentiate VPN types and explain how they operate. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain in detail the types of IDS and IPS. | CO6 | R | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Tabulate the various advantages and disadvantages of network topologies and transmission media. | CO1 | R | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Describe OSI and TCP/IP models, compare and contrast network topologies and also select the appropriate cabling type based on implementation requirements. |
| CO2 | Explain various router components, remotely access routers, and test network connectivity. |
| CO3 | Demonstrate a detailed knowledge of the operation and configuration of switches. |
| CO4 | Configure and understand the components and operation of a wireless LAN (WLAN). |
| CO5 | Demonstrate expertise in configuring host and network-level technical security controls. |
| CO6 | Identify core networking and infrastructure components and design an IT infrastructure including devices, topologies, protocols, systems software, management, and security. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 20 |  | 20 |  |  | 60 |
| CO2 | 20 |  |  |  |  |  | 20 |
| CO3 |  | 20 |  |  |  |  | 20 |
| CO4 | 20 |  |  |  |  |  | 20 |
| CO5 |  | 40 |  |  |  |  | 40 |
| CO6 | 20 |  |  |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2037** | **Duration** | **3hrs** |
| **Course Title** | **DATABASE SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Explain about the normalization in detail. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Illustrate about the following concept in detail.   1. DDL. 2. DML. 3. Referential Integrity. 4. DBMS programming language interfaces. | CO2 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Analyze the various operations for accessing file records in banking sector. | CO3 | An | 8 |
|  | b. | Prioritize the lock based protocols. | CO3 | An | 12 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Define deadlock. | CO4 | R | 2 |
|  | b. | Interpret the deadlock prevention, detection and recovery in detail. | CO4 | U | 18 |
|  |  |  |  |  |  |
| 5. | a. | Paraphrase the query optimization. | CO2 | U | 10 |
|  | b. | Describe about the ACID properties. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Dramatize the authentication technologies in LIC. | CO3 | A | 10 |
|  | b. | Devise the user roles. | CO3 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Devise about the information encryption. | CO4 | An | 10 |
|  | b. | Discriminate about the database auditing approaches. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Discuss about the RAID in detail. | CO6 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Implement the different types of backup application in the educational institution system in detail. | CO6 | A | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | design and develop database. |
| CO2 | write efficient and complex queries. |
| CO3 | identify proper authentication and authorization techniques for Database applications. |
| CO4 | design multilevel security scheme for database. |
| CO5 | perform database auditing and database performance tuning. |
| CO6 | perform database backup and recovery. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  |  | 20 |  |  | 20 |
| CO2 |  | 20 | 20 |  |  |  | 40 |
| CO3 |  |  | 10 | 30 |  |  | 40 |
| CO4 | 2 | 18 |  | 10 |  |  | 30 |
| CO5 |  |  |  | 10 |  |  | 10 |
| CO6 |  | 20 | 20 |  |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2039** | **Duration** | **3hrs** |
| **Course Title** | **BIOMETRIC SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | Describe the effectiveness of biometrics in overcoming the drawbacks of traditional strategies used in person recognition systems and identify the performance measures that can evaluate biometric systems. | | CO1 | U | 20 |
|  | **(OR)** | |  |  |  |
| 2. | Simulate the basic building blocks of biometric systems highlighting the necessity and functionality of each component. | | CO1 | A | 20 |
|  |  | |  |  |  |
| 3. | Identify any two applications of facial scan systems and discuss the effectiveness of facial scan in those applications. | | CO2 | U | 20 |
|  | **(OR)** | |  |  |  |
| 4. | Describe the components of finger scan systems and demonstrate the working of these systems. | | CO2 | U | 20 |
|  |  | |  |  |  |
| 5. | Illustrate the working of any two behavioral biometric systems and justify how they are effective in security applications. | | CO3 | E | 20 |
|  | **(OR)** | |  |  |  |
| 6. | Compare the functionality of AFIS systems with finger scan systems, and illustrate their effectiveness in security applications. | | CO3 | An | 20 |
|  |  | |  |  |  |
| 7. | Identify any two citizen-facing applications and explain the effectiveness of biometrics in such applications. | | CO4 | A | 20 |
|  | **(OR)** | |  |  |  |
| 8. | Justify the claim that biometrics offer an effective solution for real-world applications in today's society highlighting its effectiveness in applications that you use in your day-to-day life. | | CO4 | E | 20 |
|  | | | | | |
| 9. | a. | Apply DNA matching to solve a problem related to criminal identification. | CO5 | A | 10 |
|  | b. | Discuss the recent trends in biometric technologies and applications in various areas and the challenges and limitations. | CO6 | An | 10 |

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

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| **COURSE OUTCOMES** | |
| CO1 | Describe the principles of biometric systems. |
| CO2 | Recognize the various modules constituting a biometric system. |
| CO3 | Explain different types of biometric traits. |
| CO4 | Analyze basic biometric system applications. |
| CO5 | Identify the sociological and acceptance issues associated with the design and implementation of biometric systems. |
| CO6 | Infer the challenges and limitations associated with biometrics. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 |  | 40 |  |  |  |  | 40 |
| CO3 |  |  |  | 20 | 20 |  | 40 |
| CO4 |  |  | 20 |  | 20 |  | 40 |
| CO5 |  |  | 10 |  |  |  | 10 |
| CO6 |  |  |  | 10 |  |  | 10 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2041** | **Duration** | **3hrs** |
| **Course Title** | **MALWARE ANALYSIS AND ITS SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 MARKS = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a | Explain in detail the malware analysis tools and their working. | CO1 | U | 10 |
|  | b | Illustrate string extraction in malware with an example tool. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Compare the different techniques used for malware propagation and the four types of malware analysis techniques. | CO1 | An | 10 |
|  | b. | Explain in detail the working of file obfuscation for hiding malware and the techniques used to perform obfuscation. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 3. |  | Demonstrate the working of DNS and passive DNS in malware analysis. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Demonstrate the working of different techniques and tools for classifying malware. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 5 |  | Summarize the different protocols in the TCP/IP model. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate Windows registry analysis and use of regshot for analysis. | CO3 | U | 10 |
|  | b. | Demonstrate the use of process hacker for process monitoring in malware analysis. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate the working of CW sandbox and the drawbacks associated with sandbox. | CO4 | U | 10 |
|  | b. | Illustrate the naming conventions used for malware identification and detection. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the techniques used for researching IP addresses for malware analysis with an example tool. | CO5 | U | 12 |
|  | b. | Illustrate the use of hashing for analyzing malware with example tools. | CO5 | U | 8 |
| **PART – B (1 X 20 MARKS = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain in detail the types of anti-malware programs. | CO6 | U | 6 |
|  | b. | Summarize the technological components of the anti-malware engine. | CO6 | U | 14 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the concept of malware analysis, types of malware analysis and differentiate malware and a virus. |
| CO2 | Classify and compare the malware samples and Extract strings, functions, and metadata associated with the file. |
| CO3 | Use Dynamic analysis tools and understand their features, steps involved in dynamic analysis. |
| CO4 | Describe the possibilities that can make experience with sandboxes and multi-AV scanners even better. |
| CO5 | Identify and correlate information regarding domains, hostnames, and IP addresses. |
| CO6 | Discuss the challenges encountered in the field of malware analysis. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 20 | - | 10 | - | - | 30 |
| CO2 | - | 40 | - | - |  |  | 40 |
| CO3 | - | 30 | - | - | - | - | 30 |
| CO4 | - | 40 | - | - |  |  | 40 |
| CO5 |  | 20 | - | - | - | - | 20 |
| CO6 | - | 20 | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2042** | **Duration** | **3hrs** |
| **Course Title** | **SECURITY ASSESSMENT OF INFORMATION SYSTEMS THROUGH ETHICAL HACKING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the following terms with respect to Ethical Hacking  a) Hack Value b) Exploit c) Vulnerability  d) Zero day attack e) Daisy Chaining | CO1 | U | 15 |
|  | b. | Describe the elements of Information Security. | CO1 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Write short notes on the following   1. White hat hacker b. Black hat hacker c. Script kiddee   d. Payload e. Vulnerability | CO1 | R | 15 |
|  | b. | With neat diagram discuss CIA triangle. | CO1 | U | 5 |
|  |  |  |  |  |  |
| 3. |  | Explain the following  a) Viruses and its types c) Worms  b) Spy ware and Ad ware d) Session Hijacking | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize how footprinting is done using social networking site. | CO2 | E | 10 |
|  | b. | Explain any 5 footprinting tools. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Briefly discuss the various authentication and Authorization flaws that occur in web application. | CO3 | U | 12 |
|  | b. | With neat diagram explain three tier web application architecture. | CO3 | R | 8 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Determine the ways by which Android phone could be hacked. | CO3 | U | 5 |
|  | b. | Explain password cracking. Distinguish the various types of Password cracking attacks. | CO4 | U | 15 |
|  |  |  |  |  |  |
| 7. | a. | Tabulate various types of IEEE standard 802.11 and compare its properties. | CO4 | R | 8 |
|  | b. | List down web application threats and tools used for web attack. | CO4 | R | 12 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Write short notes on the following terms   1. Access Point b) SSID c) BSSID d) Bandwidth | CO5 | A | 15 |
|  | b. | Recommend the ways for Securing Wireless Networks | CO5 | A | 5 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Write any four Linux Information Gathering DNS Tools. | CO6 | A | 8 |
|  | b. | Write briefly about top 10 Windows Vulnerabilities. | CO6 | R | 12 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Determine the security threats and vulnerabilities in computer networks using ethical hacking techniques |
| CO2 | Identify various attacks in various domains of cyber space |
| CO3 | Select the tools to gather the information regarding the vulnerabilities |
| CO4 | Use techniques, skills and modern tools necessary to gather the information and to identify the  Vulnerabilities. |
| CO5 | Discuss about the exploits in various operating systems and Wireless environment. |
| CO6 | Identify the vulnerabilities associated with various network applications and database system. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 20 |  |  |  |  | 40 |
| CO2 | 10 | 20 |  |  | 10 |  | 40 |
| CO3 | 8 | 17 |  |  |  |  | 25 |
| CO4 | 20 | 15 |  |  |  |  | 35 |
| CO5 |  |  | 20 |  |  |  | 20 |
| CO6 | 12 |  | 8 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2045** | **Duration** | **3hrs** |
| **Course Title** | **SECURITY OF WEB APPLICATIONS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe various web application technologies used in front end and backend to construct web application. | CO1 | U | 10 |
|  | b. | Analyze the necessity of a vulnerability management system in protecting web applications and servers. How do different components of such a system contribute to overall security, and what are the potential consequences of not having one? | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the key components of a web application architecture and how do they interact with each other. | CO1 | U | 10 |
|  | b. | Analyze the impacts of a XSS attack on a web application and compare the effectiveness of different mitigation strategies. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Compare the common vulnerabilities that make an application susceptible to SQL injection attacks. Explain how different types of SQL injection exploit these vulnerabilities and assess the potential impact on data security. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the different types of logic attacks and prioritize these attacks based on higher risk. | CO3 | R | 10 |
|  | b. | Analyze the methods that attackers use to exploit vulnerabilities in browser plugins, and assess the impact of these attacks on both user data and system integrity. | CO3 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the techniques used by attackers to target users and describe how these techniques can compromise personal information and security. | CO3 | U | 10 |
|  | b. | Analyze the characteristics of different biometric authentication schemes and explain how they help in reducing the risk of unauthorized access to a web application or a system. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the role of Public Key Infrastructure (PKI) in securing digital communications. How do the key components of PKI work together to ensure secure data exchange? | CO4 | U | 10 |
|  | b. | Describe the methods used to manage sessions and explain the importance of each method in securing a session. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the common methods used by attackers to steal personal information. How does identity theft impact individuals and organizations, and what are the strategies to prevent it. | CO5 | U | 10 |
|  | b. | Apply your knowledge of email security practices to implement measures that protect sensitive information in email communications, and explain how to configure email settings to enhance security. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the purpose of log files and web bugs in tracking user activity on a website. | CO5 | U | 10 |
|  | b. | Describe the methods of securing web services and explain how these methods help protect applications against common vulnerabilities. | CO6 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the various methods used to provide physical security for servers. | CO6 | U | 10 |
|  | b. | Determine the security measures to protect a web server by deploying SSL Server certificate. Explain how it protects server. | CO6 | A | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Explain Web Application architecture and technologies. |
| CO2 | Identify and handle Web Application Attacks. |
| CO3 | Defend web browser from attacks. |
| CO4 | State the importance of web authentication and authorization. |
| CO5 | Exhibit privacy for users. |
| CO6 | Exhibit the skills in securing Web server. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  | 10 |  |  | 30 |
| CO2 |  |  | 20 | 10 |  |  | 30 |
| CO3 | 10 | 10 |  | 10 |  |  | 30 |
| CO4 | 10 | 10 |  | 10 |  |  | 30 |
| CO5 |  | 20 | 10 |  |  |  | 30 |
| CO6 | 10 | 10 | 10 |  |  |  | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA2046** | **Duration** | **3hrs** |
| **Course Title** | **DATA MINING IN CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the components of Data Warehouse. | CO1 | U | 10 |
|  | b. | Discuss the concept of partitioning in Data Mining. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Design a Data Warehouse Architecture for a University. | CO2 | C | 10 |
|  | b. | Describe the different types OLAP operations in detail. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Design the Data Mining Architecture for an online shopping portal. | CO1 | C | 10 |
|  | b. | Explain the various applications of association rule mining. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Solve the below transaction using Apriori algorithm and find the frequent item set.   |  |  | | --- | --- | | Tid | Items | | 10 | A, C, D | | 20 | B, C, E | | 30 | A, B, C, E | | 40 | B, E | | 50 | A,B,C,E | | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. | a. | Discuss the hierarchical methods in data mining. | CO4 | U | 10 |
|  | b. | Design decision tree for the below data and classify the buys computer attribute and illustrate the decision tree classification.  Solved In the table below there are 14 data with 4 | Chegg.com | CO3 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the following clustering methods in detail.   1. K-means 2. K-medoids 3. Clara | CO4 | U | 15 |
|  | b. | Apply the Dendrogram concept in the below data to find and merge the available clusters. | CO4 | A | 5 |
|  |  |  |  |  |  |
| 7. |  | Explain the application of k-means clustering algorithm in privacy preservation. | CO5 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Examine the various data mining techniques used in anomaly detection. | CO5 | An | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze stream mining in security applications. | CO6 | An | 10 |
|  | b. | Categorize the detecting malicious executables by applying data mining techniques. | CO6 | An | 10 |

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

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Explain various components and processes of data warehouse. |
| CO2 | Design and implement Data Warehouse to industrial requirements. |
| CO3 | Apply in association rule and classification technique in handling organizational problems. |
| CO4 | Identify pattern and knowledge hidden in complex types of data. |
| CO5 | Identify and handle anomaly detection in network. |
| CO6 | Apply appropriate data mining technique in handling Malware attacks. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 30 |  |  |  | 10 | 40 |
| CO2 |  | 10 |  |  |  | 10 | 20 |
| CO3 |  |  | 20 |  |  | 10 | 30 |
| CO4 |  | 25 | 5 |  |  |  | 30 |
| CO5 |  |  | 20 | 20 |  |  | 40 |
| CO6 |  |  |  | 20 |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2047** | **Duration** | **3hrs** |
| **Course Title** | **EMAIL AND MOBILE FORENSICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | List and briefly describe the different components of an email message. Explain how each component is useful in an email forensic analysis. | CO1 | R | 10 |
|  | b. | Develop a suitable methodology for carrying out E-Mail forensics. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Critically evaluate the role of email headers in forensic investigations. How reliable are they in tracing an email's origin, and what limitations should investigators consider? | CO1 | E | 15 |
|  | b. | Examine Microsoft E-mail Server Logs. | CO2 | A | 5 |
|  |  |  |  |  |  |
| 3. | a. | Discuss the functionalities of various types of E-mail servers and E-mail clients. | CO2 | U | 10 |
|  | b. | Describe the SMTP protocol and its importance in email communication. How does SMTP facilitate the sending and receiving of emails across different domains? | CO2 | U | 10 |
|  |  | (**OR)** |  |  |  |
| 4. | a. | Discuss the importance of the three components involved in E-mail communication. | CO3 | U | 5 |
|  | b. | Create a step-by-step methodology for analyzing a suspicious email, from examining headers to verifying the sender’s identity using SPF, DMARC and DKIM. | CO3 | C | 15 |
|  |  |  |  |  |  |
| 5. | a. | Report the various security threats associated with the infrastructure of an E-Mail. | CO4 | A | 10 |
|  | b. | Illustrate the working of POP3 in establishing communication between mail server and mail client. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe the working principle of Clutter Filtering. | CO4 | R | 5 |
|  | b. | Summarize the acquisition and analysis phases of Android device forensics. | CO5 | An | 15 |
|  |  |  |  |  |  |
| 7. | a. | Employ CFTT and JFTAG in the computer forensics with a clear explanation. | CO5 | A | 10 |
|  | b. | Prepare a suitable report on the various parameters involved in the non – traditional and older device acquisition. | CO5 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Identify the necessity of security in Mobile Applications. | CO6 | R | 10 |
|  | b. | Summarize the working principle of various open-source mobile forensics tools. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Review the various components of GSM cellular network with a suitable architecture diagram. | CO6 | E | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the role of client and server in email and the role of email in investigation. |
| CO2 | Identify, analyze and investigate the malicious email. |
| CO3 | State the need to secure the e-mail service. |
| CO4 | Outline Mobile device proliferation and their functionalities. |
| CO5 | Identify and investigate data from mobile devices using forensically sound and industry standard tools. |
| CO6 | Analyze mobile devices, their backup files, and artifacts for forensic evidence. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 |  | 10 |  | 15 |  | 35 |
| CO2 |  | 20 | 5 |  |  |  | 25 |
| CO3 |  | 5 |  |  |  | 15 | 20 |
| CO4 | 5 | 10 | 10 |  |  |  | 25 |
| CO5 |  |  | 10 | 15 |  | 10 | 35 |
| CO6 | 10 | 10 |  |  | 20 |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2048** | **Duration** | **3hrs** |
| **Course Title** | **PYTHON FOR NETWORK AND SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Apply Python’s socket programming methods to design and implement a basic client-server chat application. Explain how each method contributes to establishing and maintaining communication between the client and server. | CO1 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain what vulnerabilities are and evaluate the role of vulnerability scanners in identifying and mitigating security weaknesses in network systems. Describe the functionality of popular scanners and explain how they utilize scoring systems to assess vulnerability severity. | CO2 | U | 10 |
|  | b. | Describe the authentication mechanisms supported by the HTTP protocol, with a focus on HTTP Digest Authentication implementing a program in Python to access a protected resource using HTTP Digest Authentication. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. |  | Trace the working of a columnar transposition cipher to encrypt the following text: “Count not your chickens before they are hatched” using a matrix with 3 rows. Develop a Python program to implement this encryption method and demonstrate its functionality. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Illustrate the workings of four encryption algorithms, providing suitable examples for each and analyze the key features, strengths, and weaknesses of these algorithms. | CO3 | An | 20 |
|  |  |  |  |  |  |
| 5. |  | Design and articulate the scenarios in which a man-in-the-middle (MitM) attack occurs and suggest effective solutions to mitigate such attacks. Provide examples to justify your points. | CO4 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Categorize the various types of malware attacks discussing their harmful effects on society. Analyze specific case studies of notable malware attacks to illustrate their impact. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 7. |  | Develop Python code to apply any 5 transformations on an image and visualize the output of the transformations. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Describe the process of extracting metadata from various types of files, such as images, documents, and video files. Implement Python code to demonstrate how to extract metadata from these file types. | CO5 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the significance of Django framework in designing e-commerce applications. | CO6 | An | 10 |
|  | b. | Categorize log-based artifacts and explain their role in forensic analysis. | CO5 | An | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | write Socket program. |
| CO2 | scan network and gather information. |
| CO3 | perform ethical hacking. |
| CO4 | encrypt and decrypt and validate images. |
| CO5 | perform forensics analysis. |
| CO6 | build ecommerce application. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 20 |  |  |  | 30 |
| CO2 |  | 10 |  |  |  |  | 10 |
| CO3 |  |  | 20 | 20 |  |  | 40 |
| CO4 |  |  | 20 | 20 |  | 20 | 60 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 |  |  |  | 10 |  |  | 10 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2050** | **Duration** | **3hrs** |
| **Course Title** | **CLOUD SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Define cloud computing and explain its five essential characteristics, providing examples for each. | CO1 | R | 10 |
|  | b. | Illustrate how architectural developments in high-performance computing, scaling, and parallelism are applied in modern cloud computing environments. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Analyze the advantages and disadvantages of different cloud computing delivery models in terms of cost, scalability, and control over infrastructure. | CO2 | An | 10 |
|  | b. | Explain the key differences between the various cloud deployment models, such as public, private, hybrid, and community clouds. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Identify and describe the primary privacy and compliance risks associated with using cloud computing services. | CO3 | R | 10 |
|  | b. | Analyze the impact of health information privacy laws on healthcare providers, focusing on patient trust and organizational operations. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Evaluate the effectiveness of cloud computing security architecture in addressing common threats, such as data breaches, service outages, and unauthorized access. | CO4 | E | 10 |
|  | b. | Analyze the advantages and challenges of implementing autonomic security in cloud computing, particularly in large-scale environments. | CO4 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Analyze the impact of industry standards on the development and implementation of cloud computing technologies. | CO5 | An | 10 |
|  | b. | Explain the importance of an incident response plan and how it helps mitigate the impact of security incidents. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain how each of the four A's of Assurance contributes to overall cloud security. | CO2 | U | 10 |
|  | b. | Explain how a security policy can be applied to protect sensitive data and resources within an organization. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate the process of securing data in a cloud environment using encryption and effective key management techniques. | CO5 | A | 10 |
|  | b. | Evaluate the effectiveness of different incident response strategies in minimizing damage and ensuring business continuity after an attack. | CO5 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the impact of implementing cloud governance solutions on an organization's ability to manage security, financial, and operational risks. | CO6 | An | 10 |
|  | b. | Identify the primary legal challenges related to data privacy and security in cloud computing. | CO6 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the impact of jurisdictional issues on an organization’s data governance and compliance strategies. | CO6 | A | 10 |
|  | b. | Explain how legal issues such as liability, intellectual property, and contract terms impact cloud computing in a business context. | CO6 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Compare the deployment models versus service models of cloud computing |
| CO2 | Illustrate the architecture and categorize the services using cloud computing. |
| CO3 | Identify the known threats, risks, vulnerabilities and privacy issues associated with cloud-based IT services. |
| CO4 | Explain the concepts and guiding principles for designing and implementing appropriate safeguards and countermeasures for cloud-based IT services. |
| CO5 | Describe the industry security standards, regulatory mandates, audit policies and compliance requirements for cloud-based infrastructures. |
| CO6 | State the governance in the cloud |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 |  | 10 |  |  |  | 20 |
| CO2 |  | 20 |  | 10 |  |  | 30 |
| CO3 | 10 |  |  | 10 |  |  | 20 |
| CO4 |  |  | 10 | 10 | 10 |  | 30 |
| CO5 |  | 10 | 10 | 10 | 10 |  | 40 |
| CO6 | 10 | 10 | 10 | 10 |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CA2052** | **Duration** | **3hrs** |
| **Course Title** | **INFORMATION SECURITY ETHICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Analyze and explain the ethical principles for IT professionals. | CO1 | An | 10 |
|  | b. | Illustrate the types and implementation of business ethics in business information security system. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain smart phone ontology and ethical guidelines for using smart phones. | CO2 | U | 10 |
|  | b. | Discuss the steps in ethical decision-making and promoting ethics in information technology. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe ISC2 and ISACA code of ethics. | CO5 | R | 10 |
|  | b. | Explain IEEE/ACM software engineering and SANS Institute code of ethics. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the key personnel security principles in security operations. | CO5 | R | 10 |
|  | b. | Discuss ethical challenges involved in the development of internet and ethical guidelines for internet users. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Analyze the ethical considerations in intellectual property rights. | CO4 | An | 10 |
|  | b. | Illustrate privacy protection and laws in information security. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Enumerate the importance of ethics in copyrights. | CO4 | R | 10 |
|  | b. | Illustrate any 2 case studies of social media platforms with ethical challenges. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. |  | Summarize the ethical issues faced and ethical guidelines to be followed while using robots for communication. | CO2 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe ethical guidelines for using IoT devices. | CO3 | R | 10 |
|  | b. | Explain the ethical approaches in information security ethics. | CO1 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe ethical considerations in software development process. | CO6 | R | 10 |
|  | b. | List and explain the ethical benefits and challenges of applying CMMI in software development. | CO6 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the issues of professional conduct in information technology. |
| CO2 | Analyses the relationship with machines, and in particular with the technological devices that we use most in our everyday communication. |
| CO3 | Assess the impact of the privacy laws. |
| CO4 | Illustrate the issues related to intellectual property. |
| CO5 | Adapt several codes of ethics, from general to specific in nature. |
| CO6 | State the ethical issues that the software manufacturers face in making trade-offs between project schedules, project costs and software quality. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 20 | 10 | 10 | - | - | 40 |
| CO2 | - | 10 | - | - | 20 | - | 30 |
| CO3 | 10 | 10 | 10 | - | - | - | 30 |
| CO4 | 10 | - | 10 | 10 | - | - | 30 |
| CO5 | 20 | 10 | - | - | - | - | 30 |
| CO6 | 10 | 10 | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CA3026** | **Duration** | **3 hrs** |
| **Course Title** | **MACHINE LEARNING AND DATA ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Analyze the differences between supervised, unsupervised, and reinforcement learning in terms of data requirements, algorithm design and potential applications with examples. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Apply how cross-validation can be applied to test the performance of a machine-learning algorithm. Explain the steps involved in the process and discuss the limitations of cross-validation. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. |  | Apply linear regression to a real-world dataset of your choice. Describe the steps taken in preprocessing, model selection, and evaluation. Interpret the results and explain the significance of the regression coefficients obtained. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Assess the effectiveness of a multi-layer perceptron on a classification task compared to other algorithms such as support vector machines and decision trees. Discuss the strengths and limitations of the multi-layer perceptron model for this type of task. | CO3 | E | 20 |
|  |  |  |  |  |  |
| 5. |  | Analyze how principal component analysis reduces dimensionality of a dataset and discuss its impact on data variance and provide a step-by-step explanation of the process involved through suitable examples. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Assess the effectiveness of k-nearest neighbors compared to other supervised learning algorithms for any dataset of your choice and perform the evaluation based on factors like accuracy, interpretability and computational efficiency. | CO4 | E | 20 |
|  |  |  |  |  |  |
| 7. |  | Evaluate a support vector machine-based approach to solve a multi-class classification problem. Discuss the one-vs-one and one-vs-all strategies in support vector machines and evaluate their respective pros and cons in handling complex datasets. | CO2 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Analyze the performance of the K-means algorithm when applied to different datasets with varying cluster densities and shapes. Explain how the characteristics of each dataset impact the clustering result and discuss possible limitations of the algorithm. | CO4 | An | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Apply machine learning algorithms for predictive data analytics on a dataset. Analyze the results and interpret the effectiveness of the models. | CO5 | A | 10 |
|  | b. | Analyze how predictive data analytics can improve decision-making in specific industries such as healthcare or finance and provide examples of data types, algorithms and visualization techniques relevant to these industries. | CO6 | An | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the concepts of machine learning. |
| CO2 | Adapt dimensionality detection. |
| CO3 | Summarize the concepts of neural networks. |
| CO4 | Elaborate supervised and unsupervised algorithm. |
| CO5 | Apply machine learning for predictive analytics. |
| CO6 | Visualize the processed data. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2001** | **Duration** | **3hrs** |
| **Course Title** | **PROGRAMMING LOGIC AND DESIGN** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Classify the five major components of a computer system. | CO1 | U | 10 |
|  | b. | Explain the process of designing a program. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Differentiate do-while loop and do-until loop with examples. | CO2 | U | 10 |
|  | b. | Examine logical operators with example. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Design a class that holds the following personal data: name, address, age, and phone number. Write appropriate accessor and mutator methods. Also, design a program that creates three instances of the class. One instance should hold your information, and the other two should hold your friends’ or family members’ information. | CO5 | C | 10 |
|  | b. | Describe event handlers. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain two-dimensional array with example. | CO4 | A | 10 |
|  | b. | Summarize the processing of files concepts using loops. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the difference between passing by value and passing by reference using examples. | CO3 | U | 10 |
|  | b. | Examine user defined functions. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate logical operator with examples. | CO2 | U | 10 |
|  | b. | Discuss file input and output. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe string functions with example. | CO3 | R | 10 |
|  | b. | Differentiate procedural and object-oriented programming. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Determine UML use case diagrams with example. | CO6 | A | 10 |
|  | b. | Summarize three common rules for naming variables with examples. | CO1 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Develop a use case diagram for a college registration system. Include at least three actors and five use cases and explain. | CO6 | A | 10 |
|  | b. | Classify the types of variations using a use case diagram. | CO6 | An | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics of computers and programming. |
| CO2 | Solve problems using programming control structures. |
| CO3 | Analyze problems and represent solutions using modular programming. |
| CO4 | Organize and process data using different data structures. |
| CO5 | Apply programming skills to solve problems. |
| CO6 | Illustrate the importance of modern programming concepts. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 10 |  |  |  | 30 |
| CO2 | 10 | 20 |  |  |  |  | 30 |
| CO3 | 20 | 10 |  |  |  |  | 30 |
| CO4 |  | 20 | 10 |  |  |  | 30 |
| CO5 | 10 | 10 |  |  |  | 10 | 30 |
| CO6 |  |  | 20 | 10 |  |  | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2006** | **Duration** | **3hrs** |
| **Course Title** | **COMPUTER ORGANIZATION AND ARCHITECTURE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Interpret the postulates of the Moore’s Law with suitable examples. | CO1 | A | 10 |
|  | b. | Illustrate the working principles of various kinds of Flip Flops. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the functionalities of different categories of Logic gates with the corresponding Truth Tables and Logic diagrams. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Examine the nature of MOSFETs with a suitable explanation. | CO2 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Discuss the different sets of Addressing Modes that are available in an Instruction set with suitable examples. | CO4 | U | 10 |
|  | b. | Distinguish between the various Input and Output operations of a processor. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discover the necessary steps that are carried out in a boot process. | CO3 | A | 10 |
|  | b. | State the importance of real - time computing with suitable examples. | CO4 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Summarize the features of various processes and the threads available in an Operating Systems. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 7. | a. | Simulate the Virtualization techniques of a Processor and describe its benefits. | CO5 | A | 10 |
|  | b. | Sketch the components of a Smart Phone architecture with a suitable explanation. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Report the future directions of the Computer Architectures with a suitable explanation. | CO6 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Generalize the Processor and Memory architectures by using Von Neumann and Harvard architectures. | CO4 | U | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the architecture of a computer and the digital logic circuits. |
| CO2 | Identify the processor elements and the components of a computer system. |
| CO3 | Make use of various hardware and software interfaces. |
| CO4 | Elaborate the processor and memory architectures. |
| CO5 | Illustrate the application of computer architecture. |
| CO6 | Outline the future direction of computer architecture. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 20 | 10 | - | - | - | 30 |
| CO2 | 20 | - | 10 | - | - | - | 30 |
| CO3 | - | 10 | 10 | - | - | - | 20 |
| CO4 | 10 | 50 | - | - | - | - | 60 |
| CO5 | - | - | 20 | - | - | - | 20 |
| CO6 | - | 20 | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2007** | **Duration** | **3hrs** |
| **Course Title** | **JAVA RPOGRAMMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the features of object-oriented programming. | CO1 | U | 10 |
|  | b. | Describe the difference between primitive data type and reference data type. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Differentiate type casting and type conversion. | CO1 | U | 10 |
|  | b. | Write a JAVA program to demonstrate the concept of constructor. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 3. |  | Explain the types of inheritance with necessary example program. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Write a java program to create and import package. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Write a java program to calculate area of square, rectangle, triangle and sphere using the concept of method over loading. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Explain the types of exception handling with example. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Compare and contrast interfaces and abstract classes in Java. When would you prefer one over the other? | CO4 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain types of java thread with example program. | CO5 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain mouse handling events such as mouse listener and mouse motion listener with example. | CO6 | U | 10 |
|  | b. | Write a Java program to demonstrate grid bag layout. | CO6 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Create java programs that solve simple business problems |
| CO2 | Summarize the basic principles of object-oriented programming including constructors, inheritance,  Polymorphism. |
| CO3 | Construct programs in exception handling. |
| CO4 | Summarize multithreading concepts. |
| CO5 | Apply i/o methods in applications |
| CO6 | Develop simple graphical user interfaces. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 |  |  |  |  | 30 |
| CO2 |  | 20 | 10 |  |  |  | 30 |
| CO3 |  |  | 40 |  |  |  | 40 |
| CO4 |  | 20 |  | 20 |  |  | 40 |
| CO5 |  | 20 |  |  |  |  | 20 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2009** | **Duration** | **3hrs** |
| **Course Title** | **COMPUTER NETWORKS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Summarize the working principles of OSI model. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the physical devices and topologies used in networking. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. |  | Describe public switched telephone network in detail. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Illustrate the working principles of hamming code. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Tabulate the concept of sliding window protocol. | CO3 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Describe the concept of Dijkstra’s algorithm. | CO4 | R | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain congestion control algorithm in detail. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Analyze the concept of electronic mail in detail. | CO6 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Describe communication satellites and mobile telephone system. | CO2 | U | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the necessity for computer networks. |
| CO2 | Analyze the requirement of the physical layer. |
| CO3 | Summarize the essentials of the data link layer. |
| CO4 | Explore the issues in the network layer. |
| CO5 | Elaborate the need for the transport layer. |
| CO6 | Illustrate the importance of the application layer. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 |  | 40 |  |  |  |  | 40 |
| CO3 | 20 |  | 20 |  |  |  | 40 |
| CO4 | 20 |  |  |  |  |  | 20 |
| CO5 |  | 20 |  |  |  |  | 20 |
| CO6 |  |  | 20 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2010** | **Duration** | **3hrs** |
| **Course Title** | **SOFTWARE ENGINEERING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Identify the potential risks associated with the waterfall model and suggest mitigation strategies. | CO1 | An | 10 |
|  | b. | Discuss the primary stages involved in the iterative model. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Analyze the potential risks and benefits of adopting component-based development in a software project. | CO1 | An | 10 |
|  | b. | Compare the incremental process model with software development models like the iterative waterfall model. | CO1 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Analyze the core principles of the agile unified process and how they contribute to its iterative and incremental nature. | CO2 | An | 10 |
|  | b. | Identify and explain the three key artifacts in the scrum framework and their roles in ensuring project transparency and progress tracking. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Describe the framework of extreme programming through a suitable diagram. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 5. |  | Evaluate the effectiveness of the object-oriented design model compared to the structured design model in developing any complex software systems. Provide examples to support your evaluation. | CO3 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Discuss how architectural design contributes to the overall success of a software project. | CO3 | U | 10 |
|  | b. | Implement a component-level design for a module in a software system, ensuring it adheres to principles such as cohesion and coupling. Explain the steps involved in your design process. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Elaborate the Garvin’s Quality Dimensions concerning software quality. | CO5 | U | 10 |
|  | b. | Compare informal reviews with formal technical reviews, highlighting their key differences through examples. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the practices that can be applied to achieve high-quality software. | CO5 | An | 10 |
|  | b. | Discuss McCall’s quality factors concerning software quality. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Implement a test strategy for a conventional software application, detailing the steps involved in unit testing, integration testing, and system testing. | CO4 | A | 10 |
|  | b. | Examine the role of risk estimation in the decision-making process during software development. Discuss how accurate risk estimation can influence project outcomes. | CO6 | An | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the principles of various software process models widely used in software construction. |
| CO2 | Create effective project management plans, manage time and physical resources. |
| CO3 | Acquire knowledge about how to analyze, design and develop any application. |
| CO4 | Design test cases and effective testing procedures. |
| CO5 | Design human-computer interfaces. |
| CO6 | Develop an appreciation of the cost, quality and management issues involved in software application. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | - | 30 | - | - | 40 |
| CO2 | 10 | 20 | - | 10 | - | - | 40 |
| CO3 | - | 10 | 10 | - | 20 | - | 40 |
| CO4 | - | - | 10 | - | - | - | 10 |
| CO5 | - | 20 | - | 20 | - | - | 40 |
| CO6 | - | - | - | 10 | - | - | 10 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2011** | **Duration** | **3hrs** |
| **Course Title** | **OPERATING SYSTEM CONCEPTS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Differentiate system program and application program. | CO1 | U | 10 |
|  | b. | Discuss any four types of system calls with example. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the services provided by operating system. | CO1 | R | 10 |
|  | b. | Explain the stages involved in booting process. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Discuss any two operating system with suitable diagram. | CO2 | U | 10 |
|  | b. | Explain the different generations of operating systems and the key developments in each generation. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate the various stages of process with a suitable diagram. | CO3 | U | 10 |
|  | b. | Describe the types of operations that can be performed on processes. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. |  | Compute the average waiting time of process using FCFS, SSTF and Round robin CPU scheduling algorithm for the given input queue.  Process No. Time required Priority  P2 5ms 2  P3 4ms 1  P1 2ms 3  P4 3ms 4  Time quantum =3ms. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Discuss the characteristics of deadlock with its prevention mechanism. | CO4 | U | 10 |
|  | b. | Explain with suitable example, how to recover from deadlock. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe the types of contiguous memory allocation with example. | CO5 | R | 10 |
|  | b. | Explain the concept of virtual memory with its applications. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the structure of page table with its use. | CO5 | U | 10 |
|  | b. | Explain any two file allocation strategies with suitable example. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Calculate the seek time of Disk scheduling algorithm such as FCFS, SSTF, SCAN and CSCAN and compare the significance of each type from the result obtained for the given data.  Order of request: (82,54,167,60,180,200)  Assume current position of read write head is at 40. | CO6 | An | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the concepts of the operating systems. |
| CO2 | Outline the fundamental concepts and algorithms used in existing commercial operating systems. |
| CO3 | Demonstrate on various process scheduling algorithms and IPC. |
| CO4 | Summarize Operating System Components. |
| CO5 | Identify the different types of Operating System Services. |
| CO6 | Observe the Methods of trouble shooting. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 |  |  |  |  | 30 |
| CO2 |  | 30 |  |  |  |  | 30 |
| CO3 |  | 20 | 20 |  |  |  | 40 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 | 10 | 20 |  |  |  |  | 30 |
| CO6 |  | 10 | 20 |  |  |  | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2012** | **Duration** | **3hrs** |
| **Course Title** | **INTRODUCTION TO ARTIFICIAL INTELLIGENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the essential components that constitute an expert system. | CO1 | A | 10 |
|  | b. | Illustrate the fundamental terms and concepts related to data. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the concept of machine learning and its types. | CO2 | R | 10 |
|  | b. | Tabulate the difference between machine learning and deep learning. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the integration of robots in real-world scenarios and it’s laws. | CO3 | U | 10 |
|  | b. | Explain the applications of Natural Language Processing (NLP) in real-world contexts. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the concept of AGI and its potential implications for humanity. | CO4 | R | 10 |
|  | b. | Explain the weaponization of Artificial Intelligence and its consequences. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Describe the utilization of neural networks in recognizing handwritten digits. | CO5 | R | 10 |
|  | b. | Explain the architecture of neural networks. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the various aspects of deep learning and its challenges. | CO6 | A | 10 |
|  | b. | Describe the assumptions underlying the cost function and the Hadamard product in neural network training. | CO5 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the roles and applications of chatbots in various domain. | CO3 | A | 10 |
|  | b. | Explain the future prospects and potential advancements in AI. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the concept of decision tree. | CO2 | A | 10 |
|  | b. | Illustrate bigdata and its characteristics. | CO2 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Explain the steps involved in data engineering process. | CO2 | A | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the foundations of artificial intelligence. |
| CO2 | Analyze machine learning and deep learning algorithms. |
| CO3 | Apply artificial intelligence to solve real world problems. |
| CO4 | Implement artificial intelligence for solving problems. |
| CO5 | Outline the concepts of neural networks. |
| CO6 | Illustrate the training of neural networks. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2013** | **Duration** | **3hrs** |
| **Course Title** | **WEB TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the components of three trier architecture in detail. | CO1 | U | 10 |
|  | b. | Discuss the types of comments in PHP with example. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain various types of variables in PHP with an example. | CO1 | R | 10 |
|  | b. | Write a PHP code to demonstrate switch statement. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 3. |  | Write a PHP code to use include and require functions to add content to PHP files. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Differentiate set and Get methods with an example. | CO3 | U | 10 |
|  | b. | Explain the concept of creating constructor methods in detail. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 5. |  | Write a program to implement the concepts of classes and objects. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Write a code to create railway reservation form and validate necessary fields. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain in detail about the methods of handling exceptions. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss in detail about the necessity of backup and recovering the data. | CO5 | U | 10 |
|  | b. | Explain the steps in connecting the SQL database. | CO5 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Discuss about the session management and the necessity of verification during the session. | CO6 | U | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics about PHP. |
| CO2 | Apply control flow statements in developing applications. |
| CO3 | Make use of object-oriented concepts. |
| CO4 | Plan how to secure user interfaces. |
| CO5 | Develop web application using database. |
| CO6 | Illustrate about the authentication. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **21CA2015** | **Duration** | **3hrs** |
| **Course Title** | **FULL STACK DEVELOPMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Create a SPA for displaying your semester exam grade sheet by using AngularJS. | CO3 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Write short notes on the features of MVC architecture. | CO3 | A | 10 |
| b. | State the features and benefits of Angular JS. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 3. |  | Examine the various controls used in Angular JS forms with a suitable program. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Justify the roles of filters available in Angular JS using suitable examples. | CO5 | C | 20 |
|  |  |  |  |  |  |
| 5. |  | Analyze the various types of services provided by Angular JS. | CO4 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Assess the features of Dependency Injection in a specific scenario. | CO5 | E | 20 |
|  |  |  |  |  |  |
| 7. |  | Devise a suitable code for performing REPL and CRUD operations. | CO5 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Construct a code using Node.js event for finding the sum and product of two integer values and describe the features and basic functions of Node.js. | CO6 | C | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Create a suitable JavaScript code for finding the sum of two numeric values. | CO1 | C | 10 |
|  | b. | Define variable. Differentiate between local and global variables. | CO1 | R | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Create and bind controllers with Javascript. |
| CO2 | Apply filter in AngularJS application. |
| CO3 | Summarize Client Side MVC and SPA. |
| CO4 | Explore AngularJS Component and develop an AngularJS Single Page Application from scratch. |
| CO5 | Create Forms, validate and use filters, CRUD functions using AngularJS form. |
| CO6 | Analyze mobile devices, their backup files, and artifacts for forensic evidence. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **22CA2004** | **Duration** | **3hrs** |
| **Course Title** | **MOBILE APPLICATION DEVELOPMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Discuss the data structures used in Dart with suitable examples. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Write about any two OOPS concepts that exist in Dart with examples. | CO2 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Write about the various forms of Flutter Gestures and their corresponding events with suitable examples. | CO3 | A | 10 |
|  | b. | Examine the characteristics and the differences exist among Flutter, React Native and Xamarin tools. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Write about the various forms of Flutter Gestures and their corresponding events with suitable examples. | CO4 | A | 10 |
|  | b. | Explain Navigation and Routing of Flutter with an example. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. |  | Develop a suitable program for creating and manipulating the database containing the product details such as product id, product name, product price, product image by using the SQLite database. | CO5 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Define widget. Classify the widgets with suitable examples. | CO4 | R | 10 |
|  | b. | Compare and contrast Flutter, React Native and Xamarin tools. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. |  | Define Constructor. Write about the different forms of constructors available in Dart with suitable examples. | CO2 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain the structure of a typical employee record in a database. What fields would be important to include employee ID, name, salary and why? | CO6 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Develop a suitable program for creating and manipulating the database records containing the details of an employee such as employee id, employee name, and salary by using the Firebase. | CO6 | C | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics on dart. |
| CO2 | Explore the object-oriented concepts in dart. |
| CO3 | Design a user interface using Flutter. |
| CO4 | Build themes and animation in Flutter. |
| CO5 | Create firebase plugins. |
| CO6 | Create apps with sqlite database. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  |  |  |  | 20 |
| CO2 | 20 |  | 20 |  |  |  | 40 |
| CO3 |  | 10 | 20 |  |  |  | 30 |
| CO4 | 10 |  | 20 |  |  |  | 30 |
| CO5 |  |  |  |  |  | 20 | 20 |
| CO6 |  | 20 |  |  |  | 20 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2001** | **Duration** | **3hrs** |
| **Course Title** | **PROBLEM SOLVING USING PROGRAMMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Generalize the different generations of programming languages and give one example for each generation. | CO1 | U | 10 |
|  | b. | Discuss the various data types in C. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Analyze the use of the ‘break’ and ‘continue’ statements in C. | CO2 | An | 10 |
|  | b. | Construct a C program to find the smallest among three numbers using if statement. | CO2 | C | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the role of function arguments in C programming. How do they relate to data types, and why is this relationship important? | CO3 | U | 10 |
|  | b. | Illustrate your understanding of recursion by writing a C program that calculates the factorial of a number using a recursive function. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate one-dimensional array with suitable example. | CO4 | A | 10 |
|  | b. | Construct a C program to sort the array element in ascending order. | CO4 | C | 10 |
|  |  |  |  |  |  |
| 5. | a. | Write the syntax for Creating a new file, Opening an existing file, Reading from the file, Writing to the file and Deleting the file in C with suitable examples. | CO5 | A | 10 |
|  | b. | Define function and develop a C program to determine Square and Cube of number using function. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe the concept of pointer in C with examples. | CO5 | R | 10 |
|  | b. | Explain the purpose of the return statement in a function. How does it affect the function’s output? | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the types of string handling functions and its uses. | CO4 | U | 10 |
|  | b. | Construct a C program to perform String Handling operations. | CO4 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe how pointers can be used to pass arguments to a function. What are the advantages of passing by reference? | CO6 | U | 10 |
|  | b. | Write a program to create a file called emp.txt and store information about a person, name, age and salary. | CO6 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Develop a C program to store information of five students using structures. | CO6 | C | 10 |
|  | b. | Construct a C program to find arithmetic calculations using switch statement. | CO6 | C | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Relate character sets and data types. |
| CO2 | Apply control structure concepts in programming. |
| CO3 | Develop programs to solve computational problems using functions. |
| CO4 | Construct programs using arrays and strings. |
| CO5 | Develop programs using user-defined data types. |
| CO6 | Exhibit proficiency in applying test cases. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | - |  |  |  | 20 |
| CO2 |  |  |  | 10 |  | 10 | 20 |
| CO3 | - | 20 | 20 |  |  |  | 40 |
| CO4 | - | 10 | 10 |  |  | 20 | 40 |
| CO5 | 10 |  | 10 |  |  |  | 20 |
| CO6 |  | 10 | 10 |  |  | 20 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2003** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF COMPUTING CONCEPTS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Convert the following  (i) (110101)2 to decimal and hexadecimal.  (ii) (3𝐴9)16 to binary and decimal.  (iii) (725)8 to binary and hexadecimal. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Sketch the circuit diagram for the expression F = AB + CD + EF + GH with truth table. | CO2 | A | 10 |
|  | b. | Describe the half adder circuit, truth table and circuit diagram. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the types of secondary storage devices with examples. | CO3 | U | 10 |
|  | b. | Differentiate between SRAM and DRAM in main memory. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Analyze the impact of Application Programming Interface (API) design on operating system performance and security. | CO4 | An | 10 |
|  | b. | Explain the purpose of a file system in an operating system. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the importance of protocols in the operation of World Wide Web. | CO5 | U | 10 |
|  | b. | Describe the main layers of the Internet Protocol (IP) Suite and the purpose of each layer. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe the various states of process lifecycle in an operating system. | CO4 | U | 10 |
|  | b. | Sketch a simple digital circuit using logic gates. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Analyze the impact of cloud computing on modern IT infrastructure management. | CO5 | An | 10 |
|  | b. | Examine the color representations in RGB color model with examples. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the concept of virtual reality with examples. | CO6 | U | 10 |
|  | b. | Apply augmented reality technology to a real-world problem in the construction industry. | CO6 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the impact of Bitcoin on the global financial system with advantages and disadvantages of adopting Bitcoin as a mainstream currency. | CO6 | An | 10 |
|  | b. | Explain the impact of Internet of Things (IoT) on various industries based on efficiency and productivity. | CO6 | An | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Compare various number systems. |
| CO2 | Examine the representation of numbers and arithmetic operations. |
| CO3 | Apply the working principles of computer hardware components. |
| CO4 | Examine the core capabilities of operating systems. |
| CO5 | Differentiate various modern computing concepts. |
| CO6 | Compile the concepts of bitcoin and virtual reality. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 | - | - | - | - | 30 |
| CO2 | 10 | - | 20 | - | - | - | 30 |
| CO3 | - | 20 | - | - | - | - | 20 |
| CO4 | - | 20 | - | 10 | - | - | 30 |
| CO5 | 10 | 10 | - | 10 | - | - | 30 |
| CO6 | - | 10 | 10 | 20 | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA2007** | **Duration** | **3hrs** |
| **Course Title** | **COMPUTER NETWORKS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the terrestrial microwave transmission. | CO1 | A | 10 |
|  | b. | Enumerate the third-generation mobile phone networks in detail. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Examine error detecting techniques of checksum with example. | CO2 | A | 10 |
|  | b. | Discuss error correction in detail. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Articulate twisted pair cable of guided transmission media. | CO1 | A | 10 |
|  | b. | Examine the electromagnetic spectrum of wireless transmission. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Paraphrase the components of an email system in application layer. | CO4 | U | 10 |
|  | b. | **Explain system architecture of WWW and write the features of WWW.** | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Identify and represent the limitations and types of flooding. | CO3 | U | 10 |
|  | b. | Generalize classless addressing. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Write short note on multiple access protocols. | CO2 | A | 10 |
|  | b. | Write the advantages and disadvantages of ethernet. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Show the effects of congestion and explain leaky bucket algorithm. | CO4 | U | 10 |
|  | b. | Represent the advantages and disadvantages of UDP. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe IPv6 Addressing. | CO5 | R | 10 |
|  | b. | List and explain the types of routing protocols. | CO5 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss in detail the congestion control algorithms of network layer. | CO3 | U | 10 |
|  | b. | Illustrate routing algorithm. | CO3 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | summarize the necessity for computer networks |
| CO2 | analyze the requirement of the physical layer |
| CO3 | summarize the essentials of the data link layer |
| CO4 | summarize the issues in the network layer |
| CO5 | elaborate on the need of the transport layer and application layer |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2008** | **Duration** | **3hrs** |
| **Course Title** | **OPERATING SYSTEM SECURITY** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the process that happens in pass I of an assembler with example. | CO1 | U | 10 |
|  | b. | Differentiate system software and application software with example. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain buffer overflow attack with its types. | CO1 | U | 10 |
|  | b. | Describe storage hierarchy and give example for each level of its component. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Compute the average waiting time of process using various CPU scheduling algorithm for the given input queue.   |  |  |  | | --- | --- | --- | | Process No. | Time required | Priority | | P2 | 2ms | 1 | | P3 | 5ms | 4 | | P1 | 7ms | 2 | | P4 | 3ms | 3 | | Time quantum =3ms. | | | | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Discuss threats monitoring system to avoid program and system threats. | CO2 | U | 10 |
|  | b. | Classify the types of computer security with example. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. |  | Calculate the seek time of Disk scheduling algorithm such as FCFS, SSTF, SCAN and CSCAN and compare the significance of each type from the result obtained for the given data.  Order of request: (75,26,50,84,100,150,120)  Assume current position of read write head is at 35 | CO4 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the domain protection mechanisms with example. | CO3 | U | 10 |
|  | b. | Explain virtualization to overcome kernel exploitation with example. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. |  | Describe the conditions to prevent deadlock with example. | CO5 | U | 10 |
|  |  | Illustrate the stages of process with example. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain FIFO and LRU Page replacement algorithm with suitable example. | CO5 | R | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss different types of kernel attacks with example. | CO6 | R | 10 |
|  | b. | Describe in detail about various types of authentication methods. | CO6 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Describe the operating system concepts. |
| CO2 | Illustrate the operating system structure and its storage hierarchy. |
| CO3 | State process management. |
| CO4 | Show the capability in handling efficiently the protection mechanism and the storage. |
| CO5 | Describe the operating system security and protection mechanism. |
| CO6 | Outline the kernel exploit. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2009** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the role of classes and objects in java with an example. | CO1 | R | 10 |
|  | b. | Write a java program that creates a 3X3 two-dimensional array and populates some user defined values and prints the array in matrix form. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain looping concepts in java with proper syntax and example program. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Write a Java program that demonstrates method overloading by creating a calculateArea() method to compute the area of different shapes such as a circle, rectangle, and triangle. | CO2 | A | 10 |
|  | b. | Describe the types of access specifiers in java with an example program. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Analyze the concept of inheritance in Java. How do different types of inheritance affect class design and code reusability? Illustrate your analysis with appropriate examples. | CO3 | An | 20 |
|  |  |  |  |  |  |
| 5. | a. | Write a Java program to create and import a package with an example. | CO4 | A | 10 |
|  | b. | Explain the purpose of an interface in Java. Why would a developer choose to use an interface instead of a class? | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Analyze the purpose of exception handling mechanisms. How do they help in enhancing program reliability and debugging? | CO4 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Write a java program to read files using filereader and buffer reader methods. | CO5 | A | 10 |
|  | b. | Apply the methods for stopping a thread in Java with an example program. Explain how each method works in practice. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the different types of bounds with examples. Describe the functions and its significance of each type. | CO5 | U | 10 |
|  | b. | Explain the following layout managers   1. Flowlayout 2. Border layout | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe how an GUI application can be created using combo box. | CO6 | U | 10 |
|  | b. | Write a java program to create GUI application that allows users to choose courses of their choice. | CO6 | A | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basic principles of object-oriented programming and Java. |
| CO2 | Develop the Java program using constructors, inheritance, polymorphism. |
| CO3 | Construct Java programs using packages and exception handling. |
| CO4 | Summarize multithreading concepts. |
| CO5 | Apply I/O methods in applications. |
| CO6 | Develop simple graphical user interfaces. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2011** | **Duration** | **3hrs** |
| **Course Title** | **DATA STRUCTURES AND APPLICATIONS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Illustrate the fundamental concepts of data organization in data structures, providing examples for each concept. | CO1 | U | 15 |
|  | b. | Examine, why do we need an Asymptotic notation. Explain the different Asymptotic notations with definition and example. | CO1 | A | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Trace the working of Bubble Sort algorithm on the following list of numbers:  64, 34, 25, 12, 22, 11, 90. Show the steps of sorting the list and the intermediate states after each pass. | CO2 | A | 10 |
|  | b. | Discuss the concept of a linear array and analyze its limitations. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Identify the primary methods used to represent a stack in memory. | CO3 | R | 10 |
|  | b. | Describe how queues are represented in memory using arrays and linked lists. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain how to delete a node from the beginning and end of a linked list, providing examples for each operation. | CO4 | A | 10 |
|  | b. | List the steps involved in inserting a node at the beginning of a doubly linked list, and explain with an example. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Create a comprehensive guide that includes detailed explanations of tree terminologies and illustrate each term with diagrams. | CO5 | C | 10 |
|  | b. | Examine how binary search would search for the element 40 in the following sorted array: [10, 20, 30, 40, 50, 60, 70]. Show the steps involved and explain each step. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the primary data types commonly used in data structures and their roles. | CO1 | U | 10 |
|  | b. | Illustrate the applications of linked lists in appropriate real world scenarios. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Identify the steps required to insert a value in a Binary Search Tree and illustrate with an example. | CO5 | A | 10 |
|  | b. | Design a new graph and demonstrate how to implement the Depth-First Search (DFS) algorithm on it. | CO6 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the advantages and disadvantages of using a Binary Search Tree. | CO5 | U | 10 |
|  | b. | Explain the various representations of graph with examples in detail. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the operations of a stack, providing an example. Discuss how the stack handles edge cases such as underflow and overflow. | CO3 | U | 10 |
|  | b. | Explain linear search algorithm and list the steps involved in performing a linear search on an array. | CO2 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Illustrate the features of data structures and algorithms. |
| CO2 | Organize data in arrays and perform operations. |
| CO3 | Simulate stacks and queue concepts. |
| CO4 | Develop applications using linked lists. |
| CO5 | Experiment the usage of trees in developing programs. |
| CO6 | Organize and visualize data in graphs. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 25 | 15 |  |  |  | 40 |
| CO2 |  | 20 | 20 |  |  |  | 40 |
| CO3 | 10 | 20 |  |  |  |  | 30 |
| CO4 |  |  | 20 |  |  |  | 20 |
| CO5 |  | 10 | 10 |  |  | 10 | 30 |
| CO6 |  | 10 |  |  |  | 10 | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2013** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF GENERAL FORENSICS SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Illustrate the types of evidences found at the crime scene. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Review the necessary actions performed by a Forensic Scientist in investigating a crime. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Describe the National and International scenario on the investigation of a crime scene. | CO2 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Describe any five methods involved in searching a crime scene. | CO3 | R | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain DNA Typing and Forensic Biology in detail. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Define Forensic Chemistry and explain its applications in detail. | CO5 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Illustrate the types of digital evidences that support in investigating a Cyber Crime. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Review Hacking and Cyber Stalking approaches of Cyber Crimes. | CO4 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the processes carried out in collecting the crime evidence using Brain Fingerprinting. | CO6 | A | 10 |
|  | b. | Examine the various categories of Cyber Defamation. | CO6 | R | 10 |

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

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Illustrate the foundation of the forensic sciences and evidence. |
| CO2 | Define the roles of different types of professionals involved in evaluating a crime scene and collecting the evidence. |
| CO3 | Describe the components of the justice system. |
| CO4 | Tabulate the methodology used in collecting & interpreting data. |
| CO5 | Define the importance pertaining to forensic examination. |
| CO6 | Record the evidence in a professional court room setting. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2014** | **Duration** | **3hrs** |
| **Course Title** | **INFORMATION SECURITY** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Explain the Advanced Encryption Standard algorithm in detail. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Assess the strengths and weaknesses of RSA in protecting sensitive data in various applications. | CO2 | E | 10 |
|  | b. | Describe the key components of the SHA-3 encryption process. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 3. |  | Assess the effectiveness of simple authentication protocols in securing modern network environments. | CO3 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Categorize the common types of Intrusion Detection Systems and analyze their role in information security. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 5. | a. | Analyze the importance of secure coding practices and regular security testing in preventing software flaws. | CO5 | An | 10 |
|  | b. | Describe Software Reverse Engineering and list its primary objectives. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Compare and contrast the feistel cipher and public key cryptography in terms of their security features. | CO1 | An | 20 |
|  |  |  |  |  |  |
| 7. |  | Describe an Intrusion Detection System and its core functions in a cybersecurity framework. | CO4 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Assess the importance of real-world security protocols in modern cybersecurity practices. | CO6 | E | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Examine the various authentication approaches used in information security, highlighting their features, advantages and limitations. | CO6 | A | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Demonstrate a solid understanding of information security principles and concepts. |
| CO2 | Categorize and explain the various cryptographic algorithms. |
| CO3 | Illustrate the principles and practices of access control. |
| CO4 | Summarize the basics of network security protocols. |
| CO5 | Analyze software flaws and malware. |
| CO6 | Implement security for information using tools and technology. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  | 20 |  |  | 40 |
| CO2 | 10 |  |  |  | 10 |  | 20 |
| CO3 |  |  |  |  | 20 |  | 20 |
| CO4 | 20 |  |  | 20 |  |  | 40 |
| CO5 | 10 |  |  | 10 |  |  | 20 |
| CO6 |  |  | 20 |  | 20 |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2015** | **Duration** | **3hrs** |
| **Course Title** | **CYBER CRIMES AND CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Categorize the different types of phishing attacks and explain their relevance in the digital era using appropriate case studies. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the seven steps of hacking and describe the various hacking methods. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Discuss how the current trends and developments in technology contribute to the growth of cybercrimes and enable cyber professionals to tackle the same. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Justify the need for botnet protection and the key strategies applied for protection from botnets. | CO2 | E | 10 |
|  | b. | Analyze two case studies related to botnet attacks and explain how the attacks were mitigated in those case studies. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. |  | Analyze the reasons for the rise of cybercrimes in today’s society and discuss the need for cybersecurity. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Analyze the damages that cyber attacks can cause to organizations and discuss how organizations can protect their assets using cybersecurity measures. | CO5 | An | 20 |
|  |  |  |  |  |  |
| 7. |  | Provide a detailed explanation of each layer of the OSI model, highlighting the protocols, devices, and functions involved at each layer and illustrate how these layers work together to ensure data transmission | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain the various network attacks and the mechanisms that cyber attackers use for launching such attacks. | CO4 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Assess the significance of authentication and access control in protecting digital assets against cyberattacks and explain the different types of authentication techniques and access control models. | CO6 | E | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | differentiate between the nature of Cyber Crimes. |
| CO2 | interpret the significance of Cyber Security. |
| CO3 | identify the occurrence of cyberattacks. |
| CO4 | examine the components of cyber security. |
| CO5 | choose the suitable cyber security measures. |
| CO6 | employ strategies for protecting against the cybercrimes. |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA2016** | **Duration** | **3hrs** |
| **Course Title** | **FUNDAMENTALS OF CYBER FORENSICS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the role of electronic communication in the execution of cybercrimes. How does electronic communication facilitate cybercriminal activities? | CO1 | U | 10 |
|  | b. | Compare and contrast cybercrimes against individuals with those against property. In your analysis, highlight the different motivations, methods, types of cybercrimes with examples. | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the sequence of steps in the cyber forensics investigation process with a practical example. Illustrate how each phase (such as identification, acquisition, and preservation) contributes in building a solid chain of evidence. | CO1 | U | 15 |
|  | b. | List the File types in various Operating Systems. | CO1 | R | 5 |
|  |  |  |  |  |  |
| 3. | a. | Develop a comprehensive procedure for extracting and analyzing Windows artifacts and Linux artifacts in a digital forensic investigation. | CO2 | C | 15 |
|  | b. | List the basic principles of Cyber Forensics (CF) and explain. | CO2 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Given a standalone computer, sketch the procedure you would use to collect digital evidence while maintaining the integrity of the data. | CO2 | A | 10 |
|  | b. | Illustrate the steps an investigator might take to recover a password protected system. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Given a scenario where you must analyze a hard drive, outline the process of creating a forensic copy using a toolkit forensic imager. What steps are involved, and why is each step important? | CO3 | An | 15 |
|  | b. | List the hardware needed to perform cyber forensics operations. | CO3 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate in detail the various steps involved in E-mail header analysis. | CO4 | An | 10 |
|  | b. | Summarize how analyzing the registry can reveal user activity. How does this contribute to an investigation? | CO4 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe how to conduct forensics on social media platforms. Give a few examples for direct evidences of crimes. | CO5 | U | 10 |
|  | b. | Using section 5 of the Information Technology Act 2000 as a basis, analyze how digital signatures are legally recognized in digital forensic investigations. | C05 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | In a given scenario where digital evidence needs to be collected from an Apple Macintosh computer using Target Disk Mode, sketch the steps for acquiring evidence and ensuring its integrity. | CO6 | A | 10 |
|  | b. | Distinguish the functionalities of 1) Net Sessions 2) Netstat 3) Openfiles | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Create a step-by-step guide for capturing and analyzing a forensic copy of memory using a WinPmem forensic imager and Volatility. Ensure your guide addresses potential challenges in RAM analysis in finding out malware. | CO6 | C | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basic knowledge about cybercrime, cyber forensics and its associated concepts. |
| CO2 | Illustrate the digital evidence collection procedure and the obstacles to this process. |
| CO3 | Apply the tools used for forensic investigation, namely free and open-source. |
| CO4 | Discusses the preliminaries of electronic evidence collection and handling. |
| CO5 | apply how to analyze and document the collected evidence and present it in the court of law. |
| CO6 | Write the cyber forensics analysis report. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 5 | 25 |  | 10 |  |  | 40 |
| CO2 | 5 |  | 10 |  |  | 15 | 30 |
| CO3 | 5 |  | 10 | 15 |  |  | 30 |
| CO4 |  |  |  | 20 |  |  | 20 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 |  |  | 10 |  |  | 20 | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA2030** | **Duration** | **3hrs** |
| **Course Title** | **LINUX ADMINISTRATION AND PROGRAMMING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | With neat diagram, explain the Linux system Architecture. | CO1 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain in detail five types of files supported by Linux. | CO1 | R | 10 |
|  | b. | List the various categories in YaST Control center. | CO1 | R | 10 |
|  |  |  |  |  |  |
| 3. |  | Write short notes on the following types of files:  • Normal files • Directories • Links • Sockets • Pipes (FIFOs)  • Block Devices • Character Devices | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Categorize the various common Shell Commands with suitable examples. | CO2 | An | 10 |
|  | b. | Summarize the use of “vim” editor to edit and manipulate text files with various keystrokes | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss the boot process of Linux Operating system along with the benefits of various run levels. | CO3 | R | 12 |
|  | b. | What is systemd? Justify how systemd uses a target unit to define specific states of the system. | CO3 | A | 8 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Articulate the various command used to manage Linux Processes and Jobs. | CO3 | An | 10 |
|  | b. | With appropriate command schedule jobs that will be carried out for you on a regular schedule. Discuss with 3 examples. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Validate the various commands used to manage Users and Groups from the Command Line with suitable examples. | CO4 | E | 15 |
|  | b. | Defend how users can be prevented from logging in. | CO5 | E | 5 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Examine in detail various package management. | CO5 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Design a RAID configuration for a new Linux server. | CO6 | C | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | List various Linux commands and its flavours. |
| CO2 | Examine the remote administration and secure system boot up process. |
| CO3 | Relate process management, identity and security. |
| CO4 | Apply network security policies. |
| CO5 | Create and manage storage devices. |
| CO6 | Examine the file system and storage management. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 |  | 20 |  |  |  | 40 |
| CO2 |  | 30 |  | 10 |  |  | 40 |
| CO3 | 8 |  | 12 | 10 |  |  | 30 |
| CO4 |  | 10 |  |  | 15 |  | 25 |
| CO5 |  |  | 20 |  | 5 |  | 25 |
| CO6 |  |  |  |  |  | 20 | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3001** | **Duration** | **3hrs** |
| **Course Title** | **CYBER CRIMINOLOGY AND CRIMINAL JUSTICE ADMINISTRATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain about Crime, Tort, Misdemeanor and Juvenile Delinquency and its Prevention. | CO1 | U | 10 |
|  | b. | Distinguish between conventional crime and cybercrime. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | State the Economic offences, cyber space crime. | CO1 | U | 10 |
|  | b. | Explain about the Information security in cybercrime Penetration Testing, Incident Response and GRC. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe IPR related fraud and Social Engineering fraud and its preventions. | CO2 | U | 10 |
|  | b. | Describe Web Defacement, Hacking, Data diddling, cyber warfare, Cracking & cyber vandalism. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Enumerate the types of cyber space crime in criminology. Explain ANY SIX. | CO2 | U | 10 |
|  | b. | Explain about National & international cyber crime, cyber based political crime. | C02 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Brief about psychology cyber crime theory of Routine Activity Theory. | CO3 | A | 10 |
|  | b. | Explain psychological types of cyber criminals. | CO3 | R | 5 |
|  | c. | Describe about Modus Operandi of cyber criminals. | CO3 | U | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Define the tools and techniques adopted by cyber criminals. | CO3 | A | 10 |
|  | b. | Explain the compensation and crimes under I.T Act 2000. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | State the digital evidence during investigation of cyber crime and the problems. | CO4 | U | 10 |
|  | b. | Explain the IPC section for the types of crimes in cyber space. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Compare and contrast different anomaly detection techniques based on their strengths and weaknesses. | CO5 | AN | 10 |
|  | b. | Evaluate the performance of anomaly detection and its types of anomaly detection. | CO6 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the difference between one class support vector machine and Isolation Forest method. | CO6 | A | 10 |
|  | b. | Describe about the traditional methods of anomaly detection. | C06 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Examine the concept of crimes and cyber criminology |
| CO2 | Classify the forms of cybercrime. |
| CO3 | Identify the psychological aspects of cyber criminals |
| CO4 | State the significance of Information Technology Act and Indian Penal Code. |
| CO5 | Describe the function of the criminal justice system in relation to cybercrime |
| CO6 | Analyze the legal restrictions on the applicability of the Information Technology Act and related laws. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 | 10 | - | - | - | 40 |
| CO2 | 10 | 30 | - | - | - | - | 40 |
| CO3 | 5 | 5 | 20 | - | - | - | 30 |
| CO4 | 10 | 10 | - | - | - | - | 20 |
| CO5 | 10 | - | - | 10 | - | - | 20 |
| CO6 | 10 | - | - | 20 | - | - | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3002** | **Duration** | **3hrs** |
| **Course Title** | **WEB APPLICATION SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the purpose of scanning a web application for vulnerabilities, and describe the common techniques and tools used in this process. | CO1 | U | 10 |
|  | b. | Describe various web application technologies used in front end and backend to construct a web application. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the key components of a web application architecture and how do they interact with each other. | CO1 | U | 10 |
|  | b. | Describe the methods used to manage sessions and explain how each method helps in securing a session. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. |  | Analyze the relationship between the STRIDE threat model and the CIA Triad. What happens if threats impact the confidentiality, integrity and availability an application? | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Analyze the potential impacts of a Cross-Site Request Forgery (CSRF) attack on a web application and compare the effectiveness of different mitigation strategies. | CO3 | An | 10 |
|  | b. | Apply your knowledge of common vulnerabilities to demonstrate how a brute force attack can be executed against an authentication scheme, and explain the steps taken to strengthen the authentication process against such attacks. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 5. |  | Determine the security measures to protect a web service from common threats like SQL injection and cross-site scripting (XSS). | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe the common attack vectors used to exploit vulnerabilities in application servers. | CO4 | R | 10 |
|  | b. | Explain the techniques used by attackers to target users and describe how these techniques can compromise personal information and security. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. |  | Analyze the methods that attackers use to exploit vulnerabilities in browser plugins, and assess the impact of these attacks on both user data and system integrity. | CO4 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the security features of modern web browsers and how these features help protect users from online threats. | CO5 | U | 10 |
|  | b. | Apply countermeasures to protect a web server from a Denial of Service (DoS) attack. Demonstrate how techniques like rate limiting, firewalls, and traffic analysis can be used to mitigate the impact of such attacks. | CO5 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Apply the principles of file security to design a secure file system for an e-commerce website. Describe how you would implement access control, encryption, and auditing to protect sensitive customer information. | CO6 | A | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the vulnerabilities in web applications. |
| CO2 | Summarize the security aspect of web applications. |
| CO3 | Apply the security principles in developing a reliable web application. |
| CO4 | Summarize the importance of web authentication and authorization. |
| CO5 | Summarize the types of attacks in web applications. |
| CO6 | Summarize the security principles. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 |  |  |  |  | 30 |
| CO2 |  | 10 |  | 20 |  |  | 30 |
| CO3 |  |  | 30 | 10 |  |  | 40 |
| CO4 | 10 | 10 |  | 20 |  |  | 40 |
| CO5 | 10 |  | 10 |  |  |  | 20 |
| CO6 |  |  |  | 20 |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3004** | **Duration** | **3hrs** |
| **Course Title** | **INFORMATION SECURITY MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Given an example of a small business that primarily uses cloud services, identify potential cybersecurity risks they might face. Describe the steps they could take during the software development life-cycle to mitigate these risks. | CO1 | U | 10 |
|  | b. | Define Information Security and explain CIA triangle. Additionally, discuss the advantages and disadvantages of implementing strict information security measures in an organization. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Determine the need for Securing various components in the environment | CO1 | A | 10 |
|  | b. | Classify the life-cycle processes in cybersecurity, explaining how each phase contributes to the overall security of information systems. Provide examples for each phase to demonstrate your understanding. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Define Privacy Principles and explain how they guide the development of organizational privacy policies. Provide examples of how these principles influence data protection practices. | CO2 | U | 15 |
|  | b. | Justify personnel security is a critical aspect of an organization's overall security strategy. | CO2 | E | 5 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Analyze the impact of emerging technologies (such as artificial intelligence and IoT) on privacy. What are the key privacy risks associated with these technologies, and how can organizations mitigate these risks? | CO3 | An | 15 |
|  | b. | Justify and provide solutions for privacy in media with example. | CO3 | A | 5 |
|  |  |  |  |  |  |
| 5. | a. | Compare centralized and decentralized access control methods (such as RADIUS, TACACS, and DIAMETER) in terms of their effectiveness in managing access within a large organization. Identify one advantage and one limitation of each. | CO3 | An | 10 |
|  | b. | Given a scenario where an organization implements a new access control system, outline the steps required for effective identification and authentication of users. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Develop a comprehensive access control policy for a medium-sized company. Ensure to include the methods for authentication, authorization, and accountability. Justify your choices of methods and policies. | CO4 | C | 15 |
|  | b. | Discuss how you would integrate both centralized (e.g., RADIUS, TACACS) and decentralized methods to ensure a robust security posture. | CO4 | U | 5 |
|  |  |  |  |  |  |
| 7. | a. | Identify and explain the different types of threats and vulnerabilities that organizations may face in a cybersecurity context. How would you assess these risks to prioritize them effectively? | CO5 | U | 15 |
|  | b. | Analyze the process of risk assignment. | CO5 | An | 5 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Evaluate the role of a risk framework in guiding an organization’s risk management activities. What key components should a robust risk framework include to ensure comprehensive risk coverage? | CO6 | E | 15 |
|  | b. | Develop a strategy for selecting and assessing countermeasures to mitigate a specific risk identified in an organization. | CO6 | C | 5 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the components of a well-structured IT security policy infrastructure. What are the key elements that should be included in a security policy, and how do they align with the organization's overall objectives? | CO5 | An | 10 |
|  | b. | Describe the role of compliance in IT security management. How would you ensure that an organization remains compliant with relevant security standards and regulations (e.g., GDPR, HIPAA)? | CO6 | R | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the fundamental concepts of information security. |
| CO2 | Describe the need for life cycle process. |
| CO3 | Outline how the organization has to equip itself for effective implementation of information security. |
| CO4 | Relate the importance of privacy and how they impact the information security. |
| CO5 | State the importance of access controls and the need for an access control. |
| CO6 | Recommend suitable controls and procedures for ensuring security. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 | 10 |  |  |  | 40 |
| CO2 |  | 15 |  |  | 5 |  | 20 |
| CO3 |  |  | 5 | 25 |  |  | 30 |
| CO4 |  | 5 |  | 10 |  | 15 | 30 |
| CO5 |  | 15 |  | 15 |  |  | 30 |
| CO6 | 10 |  |  |  | 15 | 5 | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3005** | **Duration** | **3hrs** |
| **Course Title** | **PYTHON AND SCRIPTING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Compare and contrast the use of multithreading with multiprocessing in Python. | CO1 | An | 10 |
|  | b. | Explain the concept of modules and packages in Python. Discuss their importance in organizing code and managing dependencies, and provide an example of how to create and import a module. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Define BASH scripting. What are its primary uses and advantages in system administration and automation? | CO2 | R | 10 |
|  | b. | Compare the use of sed and awk for text processing in BASH. Discuss their strengths and weaknesses, and provide examples of tasks that are better suited for each tool. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Write a Python script using the dnspython library to perform a DNS query for a given domain. Include error handling and explain the output generated by the script. | CO3 | A | 10 |
|  | b. | Define OSINT. What are its primary sources and how is it typically used in cybersecurity? | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain how attackers might use valid accounts to gain initial access to a system. Discuss the implications of compromised credentials in a security breach. | CO4 | U | 10 |
|  | b. | Illustrate a scenario in which an attacker uses removable media to spread malware and outline the steps involved. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Distinguish when to use PDF files versus other formats like Excel or CSV in terms of data presentation and accessibility. Analyze the trade-offs in terms of usability, modification, and compatibility. | CO5 | E | 10 |
|  | b. | Define CSV files and discuss their structure. Provide examples of scenarios where CSV files are commonly used in data handling and storage. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain how to install, update, and uninstall packages using pip. Explain how to create and use a requirements.txt file to manage dependencies. | CO1 | A | 10 |
|  | b. | List and describe the essential elements of a BASH script, including shebang, comments, commands, and execution permissions. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate the steps to perform DNS enumeration using a tool like DNS Recon. Include commands and expected outputs that display how information is gathered about a domain. | CO3 | A | 10 |
|  | b. | Compare the advantages and disadvantages of using various OSINT tools and techniques for information gathering with traditional methods of security assessment. Include considerations about accuracy, speed, and legality. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Create a Python script that extracts and processes text from a set of PDF files, and then generates a report of the most common keywords. Explain the steps in text extraction and keyword analysis, using examples. | CO6 | C | 10 |
|  | b. | Design a server information gathering tool that uses both DNS Python and DNS Recon libraries to fetch detailed DNS data on a given domain. Explain the significance of each data type retrieved and the tool’s relevance in OSINT. | CO6 | C | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Develop a Python script that sends emails with embedded multimedia content using SMTP. Outline each step, including HTML content creation and error handling, to ensure email compatibility across various email clients. | CO6 | C | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Administer the technical environment of Python. |
| CO2 | Create interactive scripts using Linux Shell Scripting. |
| CO3 | Simulate port scanning with Python. |
| CO4 | Experiment Python in cyber space. |
| CO5 | Expertise in working with files. |
| CO6 | Create secured applications using Python. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 10 | 10 |  |  | 30 |
| CO2 | 20 |  |  | 10 |  |  | 30 |
| CO3 | 10 |  | 20 |  |  |  | 30 |
| CO4 |  | 10 | 10 | 10 |  |  | 30 |
| CO5 | 10 |  |  |  | 10 |  | 20 |
| CO6 |  |  |  |  |  | 40 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3007** | **Duration** | **3hrs** |
| **Course Title** | **DIGITAL FORENSICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Analyze Locard’s Exchange Principle to trace hair fibers found at a crime scene to solve a crime. | CO1 | An | 10 |
|  | b. | Describe the stages involved in digital forensic process. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Compare FTK Imager volatile data with non-volatile data in imaging. | CO2 | An | 10 |
|  | b. | Explain the significance of network evidence in digital forensic. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate the processes of copying, cloning and imaging techniques in digital forensics. | CO3 | U | 10 |
|  | b. | Explain the process of dead imaging in digital forensics. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Apply Autopsy tool to a hypothetical case to recover deleted files from a suspect's hard drive. | CO4 | A | 10 |
|  | b. | Examine a hypothetical case scenario involving data breaches, and draft a digital forensic report with headings and subheadings for each section of the report. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the working of encryption algorithms utilized for analysis on an infected system. | CO5 | U | 10 |
|  | b. | Classify the different types of ransomware. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Apply the documentation process in a digital forensic investigation to develop a comprehensive report for a hypothetical cybercrime incident. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. | a. | Describe the working of Wireshark in capturing network traffic. | CO2 | U | 10 |
|  | b. | Examine the role of live imaging in digital forensics. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Describe the key roles and responsibilities of a Cyber Security Incident Response Team (CSIRT) during digital forensics investigation. | CO6 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Illustrate a case study involving a suspected ransomware incident at a financial institution. | CO6 | A | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Analyze the technical aspects related to Digital Forensics. |
| CO2 | Visualize the evidence acquisition system and its functions. |
| CO3 | Apply forensic imaging in crime scene investigation. |
| CO4 | Apply the art of evidence analysis. |
| CO5 | Choose and apply ransomware incident preparation and response tools. |
| CO6 | Create incident report. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | - | 10 | - | - | 20 |
| CO2 | - | 20 | - | 10 | - | - | 30 |
| CO3 | - | 20 | 10 | - | - | - | 30 |
| CO4 | - | - | 40 | - | - | - | 40 |
| CO5 | - | 10 | - | 10 | - | - | 20 |
| CO6 | - | 20 | 20 | - | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3018** | **Duration** | **3hrs** |
| **Course Title** | **MODERN CRYPTOGRAPHY AND STEGANOGRAPHY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Describe the different historical cipher and their cryptanalysis. | CO1 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Compare and contrast Symmetric and asymmetric encryption. | CO2 | An | 20 |
|  |  |  |  |  |  |
| 3. |  | Examine the perfect secrecy and its limitation in any one of the real world application. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Apply the concept of bitcoin in real-time applications. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Describe the different types of cryptanalysis system. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Apply the cryptography and steganography techniques in the health care sector. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Compare and contrast cryptography and steganography. | CO5 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Examine the usage of digital steganography in real-time applications. | CO6 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Describe the quantum steganography in detail. | CO6 | U | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Review the principles of modern cryptography. |
| CO2 | Illustrate the different types of encryption. |
| CO3 | Select the security standards for modern cryptography. |
| CO4 | Distinguish between the cryptanalysis system. |
| CO5 | Deploy the suitable tools and methods of steganography. |
| CO6 | Represent the types of Steganography in modern day scenario. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 |  |  | 20 |  |  | 40 |
| CO2 |  |  |  | 20 |  |  | 20 |
| CO3 |  |  | 20 |  |  |  | 20 |
| CO4 |  | 20 | 20 |  |  |  | 40 |
| CO5 |  |  |  | 20 |  |  | 20 |
| CO6 |  | 20 | 20 |  |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3019** | **Duration** | **3hrs** |
| **Course Title** | **ETHICAL HACKING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Summarize the role of intangible skills for hackers. | CO1 | U | 5 |
|  | b. | Classify the various types of hackers and summarize the various hacking phases. | CO1 | An | 15 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Assess the value of passive reconnaissance in cybersecurity. How effective is it compared to active reconnaissance, and when is it most useful? | CO1 | E | 10 |
|  | b. | Describe the various tools that could be used in passive and Active Reconnaissance. | CO1 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Design a step-by-step reconnaissance plan for an ethical hacking engagement. Include both passive and active reconnaissance tools and justify the selection of each tool for specific tasks. | CO2 | C | 10 |
|  | b. | Demonstrate how a cybersecurity professional could use Nmap to gather information about open ports and running services on a target. What insights could this reveal for further security analysis? | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize the password-cracking process, including the strategies and tools used, such as John the Ripper and Hashcat. How does each tool approach password cracking? | CO3 | U | 15 |
|  | b. | Critically assess the ethical and legal implications of remote password cracking using tools like Medusa. | CO3 | E | 5 |
|  |  |  |  |  |  |
| 5. |  | Develop a Metasploit-based reconnaissance and vulnerability scanning plan for a penetration test. Include the specific modules you would use and explain why each is suitable for your goals. | CO3 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Compare the functionalities of tcpdump and Wireshark in network sniffing and protocol analysis. What are the advantages and disadvantages of each tool, especially when analyzing exploits like EternalBlue? | CO4 | U | 15 |
|  | b. | Summarize how to use Wireshark to analyze the traffic generated during an EternalBlue exploitation attempt. | CO4 | E | 5 |
|  |  |  |  |  |  |
| 7. | a. | Describe the different types of vulnerabilities commonly found in web applications. Explain how SQL Injection can be exploited to gain unauthorized access to data and demonstrate, with examples, how attackers might target WordPress sites. | CO5 | U | 15 |
|  | b. | List any five tools used in web hacking. | CO5 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Assess the process of creating basic shellcode and explain how OWASP-ZSC can be used to create obfuscated shellcode to bypass detection. Discuss the importance of obfuscation for exploitation success. | CO5 | E | 15 |
|  | b. | Explain how psychological manipulation is used in social engineering to gain unauthorized access or sensitive information. | CO6 | U | 5 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Compare the key features and differences between WPA, WPA2, and WPA3 Wi-Fi security protocols. | CO6 | U | 10 |
|  | b. | Justify the role of an access point in a Wi-Fi network, and how do access points support device connectivity. | CO6 | E | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize about ethical hacking and penetration testing. |
| CO2 | identify various types of attacks, attackers and security threats and vulnerabilities present in the computer system. |
| CO3 | examine different vulnerabilities, threats and attacks to information systems and recommend the countermeasures. |
| CO4 | analyze the techniques and ethical issues likely to face the domain of ethical hacking and ethical responsibilities. |
| CO5 | examine how social engineering can be done by attacker to gain access of useful & sensitive information about the confidential data. |
| CO6 | illustrate the basics of web application attacks and Wi-Fi attacks. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 5 |  | 15 | 10 |  | 40 |
| CO2 |  |  | 10 |  |  | 10 | 20 |
| CO3 |  | 15 |  |  | 5 | 20 | 40 |
| CO4 |  | 15 |  |  | 5 |  | 20 |
| CO5 | 5 | 15 |  |  | 15 |  | 35 |
| CO6 | 5 | 10 |  |  | 10 |  | 25 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3021** | **Duration** | **3 hrs** |
| **Course Title** | **SOCIAL MEDIA CRIMES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Assess the issues in digital privacy, assess the effectiveness of current privacy measures and policies and suggest improvements through suitable examples. | CO1 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Analyze the various social networking sites through real-time examples. | CO1 | An | 10 |
|  | b. | Apply the key legal challenges associated with regulating content on video hosting sites. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Assess the impact of social media services on personal relationships with positive and negative aspects through suitable examples. | CO2 | E | 10 |
|  | b. | Illustrate how different social media services can be used for targeted advertising and provide specific examples. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate the common usage of social media through suitable examples. | CO2 | A | 10 |
|  | b. | Evaluate the effectiveness of social media advertising for small-scale businesses and provide evidence to support your evaluation. | CO2 | E | 10 |
|  |  |  |  |  |  |
| 5. | a. | Examine a scenario of child pornography in terms of causes, consequences and countermeasures. | CO3 | An | 10 |
|  | b. | Assess the effectiveness of existing social media policies in protecting women from sexual victimization. | CO6 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Analyze the psychological effects of cyberbullying on victims and discuss both short-term and long-term impacts. | CO3 | An | 10 |
|  | b. | Illustrate the steps that individuals can take to protect themselves from online harassment and provide examples of effective strategies. | CO6 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Assess the effectiveness of current laws and regulations in protecting children from online fraud and provide evidence to support your evaluation. | CO6 | E | 10 |
|  | b. | Analyze the patterns in recent financial fraud cases on social media platforms. What are the key elements that make these schemes appealing to victims? | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the patterns of facebook victimization by categorizing common methods used by cybercriminals to exploit users. How do factors like social engineering and personal data disclosure contribute to victimization on this platform? | CO4 | An | 10 |
|  | b. | Differentiate between various types of online frauds targeting senior citizens, such as phishing, identity theft, and financial scams. Provide key characteristics and examples for each type. | CO4 | An | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Compare the strengths and weaknesses of different authorization models such as discretionary access control, role-based access control and attribute-based access control in the context of social media platforms. | CO5 | An | 10 |
|  | b. | Assess the role of continuous authentication as a proactive security measure on social media platforms. Discuss its advantages and potential privacy concerns. | CO5 | E | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Acquire social media knowledge and differentiate between social networking sites. |
| CO2 | Analyze the usage of social media on different platforms. |
| CO3 | Identify the causes, consequences, and countermeasures of Social Media Crimes against Women and Children. |
| CO4 | Categorize the other forms of social media crimes. |
| CO5 | Design best practices for privacy on social networking sites. |
| CO6 | Examine the role of the criminal justice system in social media crimes. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | - | 10 | 10 | 20 | - | 40 |
| CO2 | - | - | 20 | - | 20 | - | 40 |
| CO3 | - | - | - | 20 | - | - | 20 |
| CO4 | - | - | - | 30 | - | - | 30 |
| CO5 | - | - | - | 10 | 10 | - | 20 |
| CO6 | - | - | 10 | - | 20 | - | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3022** | **Duration** | **3hrs** |
| **Course Title** | **SECURITY IN THE CLOUD** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the characteristics of cloud computing, such as on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. | CO1 | U | 10 |
|  | b. | Apply methods and technologies such as server virtualization and load balancing used to improve energy efficiency in a cloud computing environments and demonstrate the impact on resource utilization and energy consumption. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the key privacy issues associated with cloud computing. | CO2 | R | 10 |
|  | b. | Explain the concept of threat modeling and its importance in identifying and mitigating security risks in cloud computing. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Apply a Hypervisor-based Intrusion Detection System to detect malicious activity in virtual machines within a cloud infrastructure and demonstrate how it monitors and analyzes VM behavior to identify potential security threats. | CO3 | A | 10 |
|  | b. | Explain Trusted Virtual Machine-Based Intrusion Detection System | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Apply strategies to manage different types of cloud assets, such as virtual machines, storage accounts, and networking resources within an organization’s cloud environment. | CO4 | A | 10 |
|  | b. | Explain the role of cloud network assets in the overall architecture of cloud computing and their importance in maintaining connectivity and performance. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | *Evaluate* the effectiveness of different IAM strategies in cloud environments, considering factors like security, user convenience, and administrative control. | CO5 | E | 10 |
|  | b. | Describe Role-Based Access Control (RBAC) and its key components in the context of cloud environments. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain how factors such as internet connectivity, device compatibility, and affordability affect cloud computing accessibility. | CO1 | U | 10 |
|  | b. | Describe how an organization can implement a cloud security standard, such as the ISO/IEC 27001, in its cloud infrastructure. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe how a Distributed Intrusion Detection System can be implemented in a cloud computing environment. | CO3 | A | 10 |
|  | b. | Analyze the classification of Intrusion Detection Systems, evaluate how different techniques are categorized and compare their effectiveness in detecting various types of intrusions. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the common security risks and challenges organizations face when enhancing their cloud security posture, such as misconfigurations and lack of visibility. | CO6 | An | 10 |
|  | b. | Evaluate the effectiveness of various security frameworks and best practices in improving the cloud security posture. | CO6 | E | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Define cloud security posture and identify the key elements that contribute to the assessment and enhancement of security in cloud environments. | CO6 | R | 10 |
|  | b. | Explain the importance of regularly assessing the cloud security posture to ensure the protection of data, applications, and infrastructure. | CO6 | U | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Demonstrate a solid understanding of the concepts and principles of cloud computing |
| CO2 | Identify and address cloud security and privacy issues. |
| CO3 | Implement intrusion detection systems and techniques in the cloud. |
| CO4 | Develop the ability to manage and protect cloud assets, including virtual machines, data storage and network resources |
| CO5 | Implement identity and access management in the cloud |
| CO6 | Assess and enhance cloud security posture |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 | 10 | 10 |  |  |  |  | 20 |
| CO3 |  | 10 | 20 | 10 |  |  | 40 |
| CO4 |  | 10 | 10 |  |  |  | 20 |
| CO5 | 10 |  |  |  | 10 |  | 20 |
| CO6 | 10 | 10 |  | 10 | 10 |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3024** | **Duration** | **3hrs** |
| **Course Title** | **CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Interpret the importance of Python in Cyber Security by means of its existing libraries. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Discuss the various techniques of data analysis and processing and list its related libraries in Python. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Define ARP and implement ARP spoofing using Python. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Explain Packet Crafting and its types in detail. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 5. |  | Implement the various types of SQL injection attacks by means of Python programming and evaluate their effects. | CO5 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Prepare a detailed report on Cross – Site scripting and its potential effects. | CO5 | A | 20 |
|  |  |  |  |  |  |
| 7. | a. | Rate the following NLP tasks to its complexity in terms of 1- High, 0 – Low, and 0.5 – Medium.   1. Topic Modeling 2. Spell checking 3. Machine Translation 4. Text Summarization 5. Information Extraction | CO6 | E | 10 |
|  | b. | Infer the challenges and applications of NLP. | CO6 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Assess the existing Classification models used in Machine Learning with suitable examples. | CO6 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Review the components, scope and need for Pen Testing. | CO4 | U | 10 |
|  | b. | Distinguish between Port Scanning and IP scanning. | CO2 | An | 10 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | summarize the basic libraries used in python. |
| CO2 | describe the scope of penetration testing in networking. |
| CO3 | implement a network sniffer using python. |
| CO4 | outline the process behind penetration testing. |
| CO5 | summarize the types of SQL injection attacks. |
| CO6 | implement machine learning concept in cyber security. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 40 | - | - | - | - | 40 |
| CO2 | - | - | - | 10 | - | - | 10 |
| CO3 | - | 20 | 20 | - | - | - | 40 |
| CO4 | - | 10 | - | - | - | - | 10 |
| CO5 | - | - | 20 | - | 20 | - | 40 |
| CO6 | - | - | 20 | - | 10 | 10 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3027** | **Duration** | **3hrs** |
| **Course Title** | **ARTIFICIAL INTELLIGENCE TECHNIQUES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the working principles of artificial intelligence with examples. | CO1 | U | 10 |
|  | b. | Explain the process of stimulus-response agent with example. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Compare simple reflex agent with model based reflex agent. | CO2 | An | 10 |
|  | b. | Analyze a real-world scenario of self-driving cars based on the use of sensors and actuators. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. |  | Analyze pathfinding algorithms to enhance the gaming experience for player interaction. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the importance of language and semantics in propositional logic. | CO4 | R | 10 |
|  | b. | Explain the concept of propositional calculus and their relevance to artificial intelligence. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the working of three-level architecture in Artificial Intelligence. | CO5 | U | 10 |
|  | b. | Analyze a chatbot designed for Natural Language Processing application with commonsense knowledge to make decisions. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the significance of cognitive processes in developing AI systems that simulate human thought. | CO1 | U | 10 |
|  | b. | Examine the main components of goal based agents with examples. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate the steps involved in solving the Monkey and Banana problem using search algorithms in Artificial Intelligence. | CO3 | U | 10 |
|  | b. | Differentiate between universal and existential quantifiers in predicate calculus. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Classify the different types of bootstrapping techniques in Artificial Intelligence models. | CO6 | An | 10 |
|  | b. | Illustrate the working, advantages and disadvantages of self-labeling in bootstrapping techniques. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Examine a real-world problem for triple tower architecture. | CO6 | An | 20 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Differentiate various approaches and thinking capabilities of AI. |
| CO2 | Interpret different agents and its behaviour. |
| CO3 | Solve different kinds of problems using searching methods. |
| CO4 | Apply logical thinking in implementing AI. |
| CO5 | Examine various architectures and knowledge base. |
| CO6 | Compare different mechanisms in implementing the concepts of AI. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 30 | - | - | - | - | 30 |
| CO2 | - | - | 10 | 20 | - | - | 30 |
| CO3 | - | 10 | - | 20 | - | - | 30 |
| CO4 | 10 | 10 | - | 10 | - | - | 30 |
| CO5 | - | 10 | - | 10 | - | - | 20 |
| CO6 | - | 10 | - | 30 | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3029** | **Duration** | **3hrs** |
| **Course Title** | **PYTHON FOR DATA SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | List Python's primary features and briefly describe how each feature contributes to high-level programming. | CO1 | R | 10 |
|  | b. | Illustrate the differences between positional arguments, keyword arguments, and default arguments in Python functions with examples. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Write a Python function that receives a list of words and returns a dictionary where keys are words and values are their lengths. Use list and dictionary methods. | CO2 | A | 10 |
|  | b. | Define and differentiate between lists, tuples, and dictionaries in Python. Provide examples to illustrate your answer. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Write a Python script to create a NumPy array of random numbers and calculate its mean, median, and standard deviation. | CO3 | A | 10 |
|  | b. | Explain how pandas data structures like Series and DataFrames work. Illustrate with examples showing data creation and manipulation. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain how to handle outliers in a dataset. Write a Python function that removes outliers from a list of numeric values based on a specified threshold. | CO4 | An | 10 |
|  | b. | List the key steps involved in building a machine learning model. Describe the purpose of each step briefly. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Identify and describe any five types of plots available in Matplotlib for data visualization. | CO5 | R | 10 |
|  | b. | Write a Python script using Matplotlib to create a pie chart for a given dataset. Label each section and add a legend. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Apply the stages of building machine learning models, from data collection to model evaluation, to a practical scenario. Show how each stage is executed and how decisions made at each stage contribute to the overall performance of the model. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Evaluate the effectiveness of different methods for creating bar plots in Matplotlib, comparing their advantages and limitations. Use a specific use case and code example to support your evaluation. | CO5 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Analyze the differences and similarities between box plots and violin plots. Examine how each plot visualizes data distribution and variability, and assess their suitability for various types of data analysis. Provide examples in Seaborn to demonstrate when one plot may be preferred over the other. | CO6 | An | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Design a Python project that integrates Matplotlib and Seaborn to visualize the main trends in a provided dataset. Describe the types of plots chosen and their significance. | CO6 | C | 10 |
|  | b. | Develop a Python function that generates and customizes a bar plot using Seaborn. Demonstrate its use with a sample dataset. | CO6 | C | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Develop programs to solve computational problems. |
| CO2 | Apply various data structures to effectively manage data. |
| CO3 | Perform data transformation to convert data to machine readable form. |
| CO4 | Evaluate the performance measures of a machine learning model. |
| CO5 | Visualize data to solve real-time problems. |
| CO6 | Create data visualization for effective interpretations and insights of data. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 |  |  |  |  | 20 |
| CO2 |  |  | 10 | 10 |  |  | 20 |
| CO3 |  | 10 | 10 |  |  |  | 20 |
| CO4 | 10 |  | 20 | 10 |  |  | 40 |
| CO5 | 10 |  | 10 |  | 20 |  | 40 |
| CO6 |  |  |  | 20 |  | 20 | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23CA3031** | **Duration** | **3hrs** |
| **Course Title** | **CLOUD COMPUTING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain about the Building environments of cloud computing. | CO1 | U | 10 |
|  | b. | State the principles of Parallel and Distributed computing and its advantages. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain what is virtualization, and layers of virtualization techniques. | CO2 | R | 10 |
|  | b. | Define the Purpose and Benefits of virtualization. | CO2 | U | 5 |
|  | c. | Write about the Economics of cloud open challenges. | CO2 | U | 5 |
|  |  |  |  |  |  |
| 3. | a. | Describe cloud programming and management models. | CO3 | U | 10 |
|  | b. | Define Thread and its programming applications with threads and POSIX. | CO3 | AN | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Write about Multiprocessing of parallelism for Single Machine computing. | CO3 | A | 10 |
|  | b. | Describe the two major techniques for parallel computation with Threads. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Describe in a few words the main characteristics of Aneka. | CO4 | U | 10 |
|  | b. | Discuss the logical organization of an Aneka Cloud. | CO4 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Define types of services are hosted inside the Aneka container. | CO4 | R | 10 |
|  | b. | Explain the Variations and extensions of MapReduce model. | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain about Distributed File system support of Aneka MapReduce model. | CO5 | U | 10 |
|  | b. | State the type of service is App Engine. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe social networking and Productivity in Scientific applications. | CO6 | R | 10 |
|  | b. | Define CRM and ERP in business and consumer applications of cloud. | CO6 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Define the cloud Platform industries with examples of cloud application. | CO6 | U | 10 |
|  | b. | Illustrate the architecture of SQL Azure. | CO6 | A | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Summarize the fundamental concepts and paradigms of cloud computing |
| CO2 | Develop scalable applications using cloud computing technologies and tools |
| CO3 | Evaluate security and privacy challenges in cloud computing critically |
| CO4 | Analyze performance optimization techniques for cloud-based applications |
| CO5 | Assess the economic aspects of cloud computing, including cost models, pricing strategies, and cost optimization techniques. |
| CO6 | Exhibit solutions for emerging challenges and trends in cloud computing |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 20 | - | - | - | - | 20 |
| CO2 | 10 | 20 | - | - | - | - | 30 |
| CO3 | - | 20 | 10 | 10 | - | - | 40 |
| CO4 | 20 | 10 | - | - | - | - | 30 |
| CO5 | 10 | 10 | - | - | - | - | 20 |
| CO6 | 10 | 20 | 10 | - | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3032** | **Duration** | **3hrs** |
| **Course Title** | **BIG DATA TECHNOLOGIES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the different types of compression used in Hadoop. Describe which compression method is better to improve the efficiency of network. | CO1 | U | 10 |
|  | b. | Analyze the differences among descriptive, diagnostic, and predictive analytics, and provide examples of situations where one type might be more appropriate than another. | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Compare Business Intelligence and Big Data analytics in terms of data sources, processing techniques, and business applications. | CO1 | U | 10 |
|  | b. | Differentiate between RDBMS and Hadoop in terms of data storage, scalability, and processing. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the key components of Hadoop Architecture with neat diagram. | CO2 | U | 10 |
|  | b. | Describe the three key characteristics of Big Data. How does each of these characteristics impact the way organizations handle and process data? | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain how cursors and indexes are efficiently used for retrieving and managing data within collections. | CO3 | U | 10 |
|  | b. | Describe the role of SerDe in Apache Spark. Describe any four serde functions. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 5. |  | Apply TTL and ALTER commands in Cassandra, to configure a table to store temporary session data that expires after 24 hours. Additionally, modify the schema to add a new column for tracking the last activity timestamp. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Write MongoDB commands needed to execute the following queries in an student database with documents student\_name, stud\_id, Course, Department, Active/Deactive.   * Add a new student to the database * Retrieve a list of students from a specific department * Update the active/deactive status of an existing student * Remove a student who has left the course. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Write a Pig Latin script to calculate the total sales for each product for the October month. Apply filtering, grouping, and aggregation operators to solve this problem. | CO5 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the role of SparkSession in Apache Spark and examine how it interacts with data partitions during distributed processing. Evaluate how different approaches to partitioning data influence the performance and efficiency of a Spark job. | CO5 | An | 10 |
|  | b. | Compare and contrast Big Data and Apache Spark in terms of their roles in data processing. | CO6 | An | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the different APIs available in Apache Spark and compare their advantages and limitations for processing large datasets. | CO6 | An | 10 |
|  | b. | Apply Spark DataFrames and SQL, to show how you would load a CSV file containing customer data and filter out customers who have not made a purchase in the last year. | CO6 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the fundamental of Big Data. |
| CO2 | Make use of existing big data techniques/tools. |
| CO3 | Describe the working of Hadoop. |
| CO4 | Illustrate the role of map-reduce programming in various scenarios. |
| CO5 | Develop solutions to problems using Big Data. |
| CO6 | Summarize about big data and spark. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  | 10 |  |  | 30 |
| CO2 | 10 | 20 |  |  |  |  | 30 |
| CO3 | 10 | 10 |  |  |  |  | 20 |
| CO4 |  |  | 40 |  |  |  | 40 |
| CO5 |  |  | 20 | 10 |  |  | 30 |
| CO6 |  |  | 10 | 20 |  |  | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3039** | **Duration** | **3hrs** |
| **Course Title** | **HUMAN CENTERED COMPUTING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Review the features of Usability Engineering in the process of designing a user interface model. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Recognize the role of HCI in the process of developing a software. | CO2 | R | 20 |
|  |  |  |  |  |  |
| 3. |  | Examine the Universal design principles that are necessary to develop an effective human centered computing model. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Examine the importance of UIMS in designing a user interface model. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Summarize the functionalities of the existing types of Communication and Collaboration models for designing a user interface. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Assess the nature of Cognitive models in developing a suitable interaction model. | CO5 | E | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain Virtual and Augmented Reality in detail. | CO6 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Explain Groupware and Ubiquitous Computing interfaces in detail. | CO6 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Examine the functionalities of the elements of WIMP interface. | CO1 | R | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Interpret necessity of human computer interaction. |
| CO2 | Identify the suitable design process for developing a interaction model. |
| CO3 | Discover the types of design models. |
| CO4 | Devise strategies for deployment of interaction models. |
| CO5 | Examine the right type of interaction model. |
| CO6 | Illustrate the different kinds of human computer interaction. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | - | - | - | - | - | 20 |
| CO2 | 20 | 20 | - | - | - | - | 40 |
| CO3 | - | - | 20 | - | - | - | 20 |
| CO4 | - | - | 20 | - | - | - | 20 |
| CO5 | - | 20 | - | - | 20 | - | 40 |
| CO6 | - | - | 40 | - | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3040** | **Duration** | **3hrs** |
| **Course Title** | **MODELLING TECHNIQUES IN PREDICTIVE ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Compare the predictive analytics with statistics. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the predictive analytic processing steps. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Apply the data visualization for a super market application. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Explain data preparation for any one real-time application. | CO2 | A | 20 |
|  |  |  |  |  |  |
| 5. | a. | Explain the classification process in detail. | CO4 | U | 10 |
|  | b. | Design the decision tree for the below data and classify the play golf attribute and illustrate the decision tree classification. | CO4 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the logistic regression in detail. | CO4 | U | 10 |
|  | b. | Apply the concept of clustering in various real-time applications. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. |  | Examine the general deployment considerations for building a model. | CO5 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Describe the ensemble methods in detail. | CO5 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Articulate the applications of predictive analytics in help desk and survey analysis. | CO6 | A | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | List the steps involved in predictive analytics and modeling. |
| CO2 | Apply data cleaning procedures and preprocessing techniques. |
| CO3 | Examine association rule mining and descriptive modeling for prediction. |
| CO4 | Apply Machine learning in predictive analytics. |
| CO5 | Discover the role of ensembles and text mining methods. |
| CO6 | Apply predictive modeling for solving real world problems. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  | 20 |  |  | 40 |
| CO2 |  |  | 40 |  |  |  | 40 |
| CO3 |  |  | 10 |  |  |  | 10 |
| CO4 |  | 20 |  |  |  | 10 | 30 |
| CO5 |  | 20 |  | 20 |  |  | 40 |
| CO6 |  |  | 20 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23CA3043** | **Duration** | **3hrs** |
| **Course Title** | **IMAGE PROCESSING AND COMPUTER VISION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain how correlation and convolution are used in image processing and the significance of each operation. | CO1 | U | 10 |
|  | b. | Apply a non-linear filtering technique, such as the median filter, to a noisy image and describe the changes in image quality. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Implement a shape detection algorithm using OpenCV to identify and label different shapes (e.g., circles, squares, triangles) in a given image. | CO2 | A | 10 |
|  | b. | List the various color models available in OpenCV and the methods used to convert images between these models. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the purpose of each step in the frequency domain filtering process, such as Fourier Transform, applying the filter, and inverse transformation. | CO3 | U | 10 |
|  | b. | Identify and briefly describe various types of low pass filters and high pass filters used in image processing. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the working principle of the Haar Cascade classifier in face detection | CO4 | U | 10 |
|  | b. | Implement an image segmentation technique, such as Thresholding, on a sample image using a library like OpenCV, and describe the results. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain how HOG descriptors capture edge or gradient information in an image and why they are useful for object detection tasks. | CO5 | U | 10 |
|  | b. | Implement a car detection algorithm using deep learning in OpenCV | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Compare the effects of histogram matching and histogram equalization on images, detailing the differences in the outcomes. | CO1 | An | 10 |
|  | b. | Explain how order statistics filters operate on an image and why they are particularly effective for certain types of noise, like salt-and-pepper noise. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Implement a system that uses HOG descriptors for feature extraction and SVM for object classification, and demonstrate the results on a sample dataset, such as pedestrian detection | CO5 | A | 10 |
|  | b. | Explain how the Kalman Filter estimates trends in motion over time, including the process of prediction and correction based on noisy observations. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Implement a background subtraction algorithm to track moving objects in a video, demonstrating the steps involved in extracting moving objects from a dynamic scene. | CO6 | A | 10 |
|  | b. | Analyze the performance of Mean Shift and CAMShift in tracking objects under different conditions, such as scale variation, rotation, and occlusions. | CO6 | An | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain how a CNN works, detailing the function of convolutional layers, activation functions, and pooling layers in feature extraction and classification. | CO6 | U | 10 |
|  | b. | Define Augmented Reality (AR) and list the key technologies involved in its development, such as sensors, computer vision, and display technologies. | CO6 | R | 10 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the fundamental concepts of image processing. |
| CO2 | Utilize OpenCV for processing images. |
| CO3 | Apply image processing techniques in real life situations. |
| CO4 | Apply image search techniques using OpenCV. |
| CO5 | Demonstrate object detection and tracking techniques. |
| CO6 | Summarize the importance of neural networks and Augmented Reality in image processing. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 10 | 10 |  |  | 30 |
| CO2 | 10 |  | 10 |  |  |  | 20 |
| CO3 | 10 | 20 |  |  |  |  | 30 |
| CO4 |  | 10 | 10 |  |  |  | 20 |
| CO5 |  | 20 | 20 |  |  |  | 40 |
| CO6 | 10 | 10 | 10 | 10 |  |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA3044** | **Duration** | **3hrs** |
| **Course Title** | **MACHINE LEARNING OPERATIONS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | List the people who involved in machine learning operation and explain. | CO1 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Summarize the feature engineering and selection of data exploration in detail. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Analyze the strategies for developing machine learning model intended for healthcare data. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Analyze a scenario in the real-time application for the model retraining and degradation occurs. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 5. |  | Illustrate the machine learning security and model risk mitigation. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Assess the drift detection using the diverse methods in machine learning models. | CO4 | E | 20 |
|  |  |  |  |  |  |
| 7. |  | Describe the deployment to production for machine learning in detail. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Assess the regulations driving MLOPs governance for an educational online portal. | CO5 | E | 10 |
|  | b. | Explain the emergence of responsible AI in machine learning model. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Describe MLOPs in practice for consumer credit risk management. | CO6 | R | 20 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Interpret the MLOps and the role of ML experts. |
| CO2 | Identify and mitigate common challenges when training, evaluating and deploying ML models. |
| CO3 | Discover the risks associated with ML model and provide security solutions. |
| CO4 | Devise strategies for deployment and monitoring of ML models. |
| CO5 | Choose the right model type for specific problems. |
| CO6 | Deploy scalable ML systems that you can retrain and update to reflect new data. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 |  |  |  |  |  | 20 |
| CO2 |  | 20 |  | 20 |  |  | 40 |
| CO3 |  |  | 20 |  |  |  | 20 |
| CO4 |  | 20 |  | 20 | 20 |  | 60 |
| CO5 |  | 10 |  |  | 10 |  | 20 |
| CO6 | 20 |  |  |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA3046** | **Duration** | **3hrs** |
| **Course Title** | **DEEP LEARNING TECHNIQUES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Categorize activation functions and analyze their strengths and weaknesses in the context of machine learning using appropriate examples. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the role of artificial neural networks in machine learning and examine best practices for improving the training phase in deep learning, highlighting the strategies to mitigate common issues. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Explain the functionalities of the components of a convolutional neural network and illustrate why they are appropriate for image processing applications. | CO2 | U | 10 |
|  | b. | Implement an image processing application with CNN using Python code. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain various deep learning models used for processing audio and video applications, and examine how their architectures make them suitable for such tasks. | CO2 | U | 10 |
|  | b. | Categorize the different types of convolution operations and identify their specific applications. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. |  | Sketch the components of Generative Adversarial Networks and explain their working in detail in the context of real-world applications. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Illustrate the role of different types of Word Embedding models in Natural Language Processing with suitable examples. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain the variants of recurrent neural networks and their features in detail. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Illustrate the concepts and working of transformer architecture. | CO4 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Examine the working of Deep Q-Networks and Deep Deterministic algorithms in the context of reinforcement learning applications. | CO5 | E | 20 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | summarize the fundamental concepts of neural networks. |
| CO2 | illustrate the concepts of convolutional neural networks. |
| CO3 | create generative adversarial networks. |
| CO4 | apply recurrent neural networks for solving applications. |
| CO5 | demonstrate the applications of reinforcement learning. |
| CO6 | application of deep learning in cloud and mobile applications |

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

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA3048** | **Duration** | **3hrs** |
| **Course Title** | **ROBOTIC PROCESS AUTOMATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Analyze the role of actuators, grippers, and various types of sensors in robotic systems by discussing their functionalities and classifications. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Evaluate the role of computer control in robotics and explain how robot software interfaces with hardware to perform specific tasks. | CO2 | E | 20 |
|  |  |  |  |  |  |
| 3. |  | Assess the practical applications and effectiveness of Graph Based Planners in real-world robotic systems, with examples. | CO3 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Analyze how each feature and tool within UiPath Studio contributes to building effective RPA solutions. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain the various techniques used for finding and attaching windows in RPA. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the concept of the Potential Field Methodology in Robotic Process Automation (RPA). | CO2 | R | 10 |
|  | b. | Describe the core principles of Wavefront-Based Planners in pathfinding algorithms. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the concept of a task recorder in Robotic Process Automation (RPA). | CO4 | U | 10 |
|  | b. | Analyze the causes and consequences of bot failures due to data inconsistencies or discrepancies in an RPA process. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Evaluate the effectiveness of different methods used to control user interface elements in RPA. | CO6 | E | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Articulate the practical steps of using UiPath’s recording tool for automating the process of copying data from a webpage and pasting it into a notepad file. | CO6 | A | 10 |
|  | b. | Explain the key steps and components in the process of exporting data from excel to webpage using UiPath. | CO6 | A | 10 |

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

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the techniques used in RPA. |
| CO2 | Understand the software’s that used to implement RPA. |
| CO3 | Acquire knowledge about different technology used in AI Robotics. |
| CO4 | Learn the methodology used in AI Robotics. |
| CO5 | Navigate and Manipulate data. |
| CO6 | Summarize data manipulation Techniques. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  |  | 20 |  |  | 20 |
| CO2 | 10 |  |  |  | 20 |  | 30 |
| CO3 | 10 |  |  |  | 20 |  | 30 |
| CO4 |  | 10 |  | 20 |  |  | 30 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 |  |  | 20 |  | 20 |  | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CA3050** | **Duration** | **3hrs** |
| **Course Title** | **NATURAL LANGUAGE PROCESSING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Review the challenges and applications of NLP. | CO1 | U | 10 |
|  | b. | Sketch the building blocks of a language and mention their applications. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain the concepts of Machine Learning, Deep Learning and NLP with an illustration. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Apply the given CFG production rule for generating ten sentences in English.  **NP -> DT N.** | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Define CFG and tabulate the pros and cons of CFG. | CO4 | R | 20 |
|  |  |  |  |  |  |
| 5. |  | Assess the grammar of the following sentence using CKY parsing algorithm.  *We buy drinks with milk*. | CO5 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Determine the possible thematic arguments of the verb ‘break’ using ten sentences by representing their thematic roles. | CO6 | A | 20 |
|  |  |  |  |  |  |
| 7. |  | Predict Synonymy, Antonymy, Meronymy and Derivationally related form for the following words using a block diagram.   1. “Vector” and “Natural” 2. “Machine” and “Image” 3. “Text” and “Deep” 4. “Network” and “Rule” 5. “Hybrid” and “Break” | CO5 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Evaluate Constituency Parsing using a suitable example. | CO5 | E | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Simulate BoW approach of text classification for the following:  sentence = ['coronavirus is a highly infectious disease',  'coronavirus affects older people the most',  'older people are at high risk due to this disease']. | CO3 | A | 10 |
|  | b. | Describe any one approach of representing the text with an example. | CO2 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | understand about regular expressions. |
| CO2 | develop N-gram Language Models. |
| CO3 | acquire knowledge about vector semantics. |
| CO4 | summarize about sequence Labeling, Machine Translation and Constituency Grammars. |
| CO5 | demonstrate about parsing techniques. |
| CO6 | illustrate about logical representation and word senses. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 30 | 10 | - | - | - | 40 |
| CO2 | - | 10 | - | - | - | - | 10 |
| CO3 | - | - | 10 | - | - | - | 10 |
| CO4 | 20 | - | - | - | - | - | 20 |
| CO5 | - | 20 | 20 | - | 40 | - | 80 |
| CO6 | - | - | 20 | - | - | - | 20 |
|  | | | | | | | **180** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **23LN2001** | **Duration** | **3hrs** |
| **Course Title** | **FRENCH – I** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Repondez  1. Qui est le Président de la France ?  2. Nommez des fleuves?  3. Quelle couleur aimes-tu?  4. Quel est ton nom?  5. Nommez des fruits?  6. Quelles sont le drapeau francais? | CO6 | U | 12 |
|  | b. | Completez  1. \_\_\_\_\_\_\_\_\_construit la tour Eiffel  2. La France s’appelle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a. L’hexagone b. L’octogone c. le pentagone  3. \_\_\_\_\_\_\_\_\_\_est capitale de la France.  4. Je travaille \_\_\_\_\_\_\_\_\_\_Varsovie. (à /de)  5. Viens \_\_\_\_\_\_ (à /de) Sao Paulo  6. Je \_\_\_\_\_ (viens /habite) à Paris  7. \_\_\_\_\_\_\_\_\_est brésilienne. (je /Il/vous)  8. Moi, \_\_\_\_\_\_\_\_travaille à Paris. | CO2 | R | 8 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | **Complétez les phrases avec ces verbes au futur proche**  **Avoir, adorer, danser, étudier, téléphoner, visiter**  1. L’année prochaine, Je \_\_\_\_\_\_\_\_\_le français a Royen.  2. Nous \_\_\_\_\_\_Paris en mai.  3. Nicole et Paul \_\_\_\_\_le gâteau au chocolat.  4. Nous \_\_\_\_\_\_\_\_tous ensemble vendredi prochain.  5. Demain, Il \_\_\_\_\_\_\_\_\_une belle surprise pour son anniversaire  6. Vous \_\_\_\_\_a Lucie ce soir ? Elle est malade.  **Conjuguez les verbes**  1. Je \_\_\_\_\_\_\_\_\_\_\_\_du poisson (manger)  2. Tu \_\_\_\_\_\_\_\_\_petite et mince (être)  3. Ma sœur \_\_\_\_\_\_\_\_\_\_ (chanter) bien.  4. Nous \_\_\_\_\_\_\_\_\_\_\_\_\_ (avoir) un bon cadeau.  5. Ton frère \_\_\_\_\_\_\_\_\_\_\_ (écouter) de la musique.  6. Je \_\_\_\_\_\_\_ (habiter) à Paris.  7. Tu \_\_\_\_\_\_\_ (être) libre  8. Vous \_\_\_\_\_ (aimer) le tennis | CO3 | R | 14 |
|  | b. | Écrivez les jours de la semaine. | CO4 | R | 6 |
|  |  |  |  |  |  |
| 3. | a. | La tour Eiffel a été construite en 1889. A) Vrai b) faux | CO6 | R | 1 |
|  | b. | Comment vas -tu ? | CO2 | U | 1 |
|  | c. | Ecrivez en anglais : Bienvenue, Bonsoir | CO4 | R | 2 |
|  | d. | Ecrivez deux saisons | CO2 | R | 2 |
|  | e. | **Lisez le passage of répondez aux questions suivantes**  L’année dernière,, j’ai visité Paris pour la première fois. Avant mon arrivée. J’ai retenu une chambre à un lit à l’hôtel du Palais Royal.  J’ai visite de belle Cathradale. J’ai vu la tour Eiffel et les autres monuments. J’ai pris mes repas dans les restaurants français. La France est très célèbre pour ses vins et ses fromages. J’ai acheté beaucoup de sortes de fromages pour ma famille et une bouteille de jus frais pour  Mon père. Les gens parisiens sont très aimables et sympathiques. C’est une belle ville pleine de charme.  **1. Répondez aux questions suivantes.**  1. Pourquoi la France, est-elle célèbre ?  2. Décrivez Paris par une phrase complète  **Dites vrai ou faux**  1. Les gens parisiens sont antipathiques.  2. La France est célèbre pour ses fromages.  3. Paris est une ville morte.  **Trouvez dans le texte**.  1. Un autre mot pour « fameux » \_\_\_\_\_\_\_\_\_\_\_\_\_\_  2. Le contraire de « laide » \_\_\_\_\_\_\_\_\_ avant \_\_\_\_\_\_\_\_\_\_  Départ \_\_\_\_\_\_\_\_\_\_\_  3. Un mot pour « une pièce où l’on couche «  **Complétez avec un/des mots du texte.**  1. La semaine \_\_\_\_\_\_\_\_\_\_\_J’ai organisé une boum chez moi.  2. Combien de \_\_\_\_\_\_\_\_\_\_de desserts as-tu prépares ?  3. Nous avons nettoyé la maison \_\_\_\_\_\_\_\_\_\_le retour  de nos parents.  4. Donnez-moi une \_\_\_\_\_\_\_\_\_\_\_d’eau minérale. | CO3 | U | 14 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | **I. Mettez les phrases à la forme négative :**  1. nous parlons anglais  2. J’ai 33 ans.  3. Elles vont aux Etas unis  4. Je travaille dans une banque.  5. elles voyagent beaucoup.  6. Nous finissons mon travail.  7. Elle est directrice  8. vous êtes français  9. Mohan finit son travail  10. Anila veut un café | CO2 | R | 10 |
|  | b. | 2**. Complétez avec (quel, quelle, quels, quelles)**  1. A \_\_\_\_\_nom vous avez une réservation ?  2. \_\_\_\_\_\_\_\_\_\_\_\_est le numéro de votre chambre ?  3. De \_\_\_\_\_\_\_\_pays est-ce que vous arrivez ?  4. \_\_\_\_\_\_\_\_\_\_couleur aimes-tu ?  5. \_\_\_\_\_\_\_\_\_\_belles voitures.  6.Tu prends \_\_\_\_\_\_\_\_\_bus.  7. \_\_\_\_\_\_heure est-t-il ?  8. \_\_\_\_\_\_\_plage vont-ils  9. \_\_\_\_\_\_ plat aimes-tu?  10. \_\_\_\_\_\_\_\_langue parlez-vous? | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | **Lisez le texte et répondez aux questions.**  Bonjour mes amis! Je m’appelle Syraa. Je suis française. J’ai dix ans. J’ai un frère. Mon frère a douze ans. Il est méchant. J’ai des amis. Ma meilleure amie s’appelle Céline. Elle est canadienne. Elle est dans ma classe. Elle est belle.  Son père est médecin et s mère est professeur.  1) Répondez :  a) Syraa a un frère ?  b) Quelle est la nationalité de Syraa?  c) Comment s’appelle l’amie de Syraa?  d) Que fait la mère de Céline ?  e) deux nationalités : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  f) deux adjectifs : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | CO4 | U | 10 |
|  | b. | Écrivez les verbes conjugaison  Être, avoir, aller, venir, faire | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Complétez avec les adjectifs possessifs (  1. Pour les vacances d’été, nous allons en Italie avec \_\_\_\_\_\_\_enfants. (mon/ma/mes  2. Martine et Michel téléphonent tous les jours à \_\_\_\_\_\_fille. (son /sa/ses)  3. Tu emportes\_\_\_\_\_\_ grosse valise et \_\_\_\_\_\_\_\_ordinateur portable à Paris ? (ta /ton /tes)  4. Vous pouvez me donner\_\_\_ numéro de téléphone ? Je vous appelle demain (vos /votre)  5. A midi, Je déjeune avec \_\_\_\_\_\_\_\_collègues de travail. (mon /ma /mes)  6. Je parle avec \_\_\_\_\_\_père (mon /ma/mes) | CO3 | U | 6 |
|  | b. | 1. Écrivez les mois de l’année  2.Ecrivez les nombres 1 - 20 | COI  CO2 | R  R | 7  7 |
|  |  |  |  |  |  |
| 7. | a. | **a. Reliez**  1. Ou vas-tu? - Je viens de l’inde  2. D’où viens-tu? - Je vais à paris  3. Ou sont- elles? - Je vais bien  4. Ou se trouve le restaurant ? - Elles sont dans la chambre  5. comment vas-tu ? - J ‘ai dix-huit ans  6. Quel âge as-tu - Je suis indien  7. quelle est ta nationalité - Le restaurant est en face du musée  **Conjuguez le verbe au passe compose**  1.Nous \_\_\_\_\_\_\_\_\_\_\_\_\_\_(inviter) nos amis   1. Vous \_\_\_\_\_\_\_\_\_\_\_\_\_\_(faire) son devoir 2. Il \_\_\_\_\_\_\_\_\_\_\_\_(visiter) le temple 3. Tu \_\_\_\_\_\_\_\_\_(boire) de l’eau 4. Elles \_\_\_\_\_\_\_\_\_\_\_\_\_\_(finir)le train   C.Ecrivez le participe passe (past participle)  Être , avoir , pouvoir , prendre, lire , vouloir, | CO5  CO3 | U  R | 7  7 |
|  | b. | **Choisissez un verbe et mettez-le à la forme qui convient :**  1.Isabelle (être /avoir) \_\_\_\_27 ans.  2. Vous \_\_\_\_\_(habiter /présenter) à Mexico.  3. Tu me (présenter/travailler) \_\_\_\_\_ton ami  4. Christina (être / s’appeler) \_\_\_\_\_\_\_\_\_espagnole et elle (avoir/habiter) en France.  5. Fabienne\_\_\_\_ (travailler / être) éditrice  6. elle \_\_\_\_\_\_\_(travailler / habiter) aux éditions Pixma. | CO3 | R | 6 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Écrivez le mot “ small “ en français | CO3 | R | 1 |
|  | b. | Écrivez le mot “ petit déjeuner “ en anglais | CO3 | R | 1 |
|  | c. | Ecrivez deux monuments en France | CO5 | R | 2 |
|  | d. | Nommez deux fromages | CO3 | R | 2 |
|  | e. | Présentez-vous | CO4 | U | 14 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Traduisez en anglais  ISABELLE TIVAUT. Bonjour, bienvenue aux éditions Prixma.  Isabelle Tivaut, je suis la directrice, je vous présente Christian Rigon, directeur du français, voici Fabienne, éditrice, et là.  C’est Philipe ; il est directeur de l’international. Merci beaucoup de travailler dans vos pays pour les éditions Pixma.  Vous pouvez vous présenter, s’il vous plait ?  Oui, commencez, Barbara, D’accord.  Barbara : Bonjour, je suis Barbara Malecka :  Je travaille pour prixma à Varsovie.  Blandine : Moi, c’ Blandine ; Je suis française et travailler à Mexico.  AMANDA : Et tu habites a Mexico ?  BLANDINE : Oui, oui, j’habite a Mexico.  ISABELLE MARTIN : Isabelle Martin, je viens de Madrid.  ISABELLE TIVAUT : Très bien, Et vous, vous êtes….  FREDERIC : Bonjour, Moi, Je m’appelle Frederic et je travaille à Genève.  AMANDA : Tu es suisse ?  FREDERIC : Et non ! Je ne suis pas suisse, Je suis belge.  Amanda : Je viens de Sao Paulo et je travaille dans tout le pays : A Riio de Janeiro, a Brasile. | CO6 | U | 14 |
|  | b. | 1. Écrivez une invitation. À votre ami pour inviter à votre anniversaire. Il n’est pas là. Lisez un message. | CO6 | R | 6 |

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

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Become familiar with the basics of the language |
| CO2 | Introduce himself /herself and others and can ask the question and answer about personal details To ensure that the students have a glimpse of the French culture, tradition and literature. |
| CO3 | Construct the simple sentences in French using accurate rudiments of syntax and grammar |
| CO4 | Write short paragraph on simple topics (daily routine, shopping, describing, vacation etc.) |
| CO5 | Interact in a simple way provided the other person talks slowly and clearly and is prepared to help |
| CO6 | Learn the various strategies to overcome the basic difficulties in LSRW |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | - |  |  |  |  | 7 |
| CO2 | 30 | 10 |  |  |  |  | 40 |
| CO3 | 37 | 21 |  |  |  |  | 58 |
| CO4 | 8 | 24 |  |  |  |  | 32 |
| CO5 | 2 | 7 |  |  |  |  | 9 |
| CO6 | 7 | 27 |  |  |  |  | 34 |
|  | | | | | | | **180** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23LN2003** | **Duration** | **3hrs** |
| **Course Title** | **TAMIL - I** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | ஒழுக்கமுடைமையில் கூறப்பட்டுள்ள ஒழுக்கலாறுகளை வள்ளுவரின் வழி நின்று விளக்குக. | CO3 | U | 10 |
|  | b. | தமிழ் இலக்கிய வரலாற்றின் ஏழு காலக்கட்டங்களைப் பற்றி கட்டுரை வரைக. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | 1. தேம்பாவணியின் ஆசிரியர் ----------- 2. பாரதிதாசன் ------என்னும் ஒரு திங்களிதழை நடத்தி வந்தார். 3. விடை ------ வகைப்படும். 4. பதினெண்கீழ்க்கணக்கு நூல்கள் எத்தனை? 5. ஆடலரசியான மாதவிக்கு வழங்கிய பட்டம் ---------- 6. எங்கள் தாய் கவிதையின் ஆசிரியர் பற்றி குறிப்பு வரைக. | CO3  CO2  CO5  CO3  CO3  CO2 | R  An  U  R  R  U | 1  1  1  1  1  5 |
|  | b. | பாரதியாரின் தமிழ்தாய் பற்றிய கருத்துகளை கட்டுரை வரைக. | CO2 | AN | 10 |
|  |  |  |  |  |  |
| 3. | a. | பதினெண் கீழ்க்கணக்கு நீதி நூல்களை பகுப்பு வைப்பு முறையில் விளக்குக. | CO3 | U | 10 |
|  | b. | வருங்கால மனிதன் கவிதையின் சாரத்தை கட்டுரை வரைக. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | ஹைக்கூ கவிதை - கட்டுரை வரைக. | CO2 | An | 10 |
|  | b. | இலக்கணம் - எட்டு விடை வகையை விவரி. | CO5 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | கிறிஸ்தவர்கள் கிறிஸ்தவ சமயத்தை பரப்பும் நோக்கில் தமிழுக்குச் செய்த பணிகளை விளக்குக. | CO1 | U | 10 |
|  | b. | சீவகசிந்தாமணி மற்றும் மணிமேகலை குறிப்பு வரைக. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | மேலைநாட்டுக் கிறித்தவ தமிழ் தொண்டர்கள் இருவரைப் பற்றி விவரிக்க. | CO1 | E | 10 |
|  | b. | சிலப்பதிகாரம் – அரங்கேற்றுக்காதையை கட்டுரை வரைக. | CO3 | E | 10 |
|  |  |  |  |  |  |
| 7. | a. | இலக்கணம் - வினா வகையை எடுத்துக்காட்டு தந்து விவரி. | CO1 | An | 10 |
|  | b. | 1. வீரமாமுனிவர் – ஆசிரியர் குறிப்பு வரைக. 2. தமிழ் ஒளி – ஆசிரியர் குறிப்பு வரைக. | CO3  CO2 | R  U | 5  5 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | இலக்கணம் - பெயர்ச்சொல், வினைச்சொல் எடுத்துக்காட்டு தந்து விவரிக்க. | CO5 | U | 10 |
|  | b. | “கடல்” மற்றும் “குன்றம்” கவிதையின் சாரத்தை விளக்குக. | CO2 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 1. | வீரமாமுனிவர் | இராபர்ட் தெ நோபிலி | | 2. | தமிழருக்கான மருத்துவ ஊழியர் | [திராவிட மொழிகளின் ஒப்பிலக்கணம்](https://ta.wikipedia.org/wiki/%E0%AE%A4%E0%AE%BF%E0%AE%B0%E0%AE%BE%E0%AE%B5%E0%AE%BF%E0%AE%9F_%E0%AE%AE%E0%AF%8A%E0%AE%B4%E0%AE%BF%E0%AE%95%E0%AE%B3%E0%AE%BF%E0%AE%A9%E0%AF%8D_%E0%AE%92%E0%AE%AA%E0%AF%8D%E0%AE%AA%E0%AE%BF%E0%AE%B2%E0%AE%95%E0%AF%8D%E0%AE%95%E0%AE%A3%E0%AE%AE%E0%AF%8D_(%E0%AE%A8%E0%AF%82%E0%AE%B2%E0%AF%8D)) | | 3. | பெஸ்கிப் பாதிரியார் | ஐய வினா | | 4. | தத்துவ போதக சுவாமிகள் | தேம்பாவணி | | 5. | இதுவோ? அதுவோ? | சாமுவேல் | | 6. | கால்டுவெல் | வாடாத பூமாலை | | 7. | தேம்பா + அணி | ராஜரிஷி |   1.பொருத்துக  . 2.நாலடியார் பற்றி குறிப்பு வரைக. | | CO6  CO3 | U  U | 7  3 |
|  | b. | ஐம்பெரும் காப்பியங்கள் யாவை? கட்டுரை வரைக. | CO3 | R | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | கிறித்தவ இலக்கியம் பற்றியும், கிறித்தவ தமிழ்த் தொண்டர்களின் படைப்பாற்றல் பற்றி அறிதல். |
| CO2 | இருபதாம் நூற்றாண்டு படைப்பாளர்களின் புதுக்கவிதை நிலைப்பாடுகள், கற்பனை, உத்தி, சமூகச்சிந்தனைகள், தீர்வுகள் போன்றவற்றை எடுத்து இயம்புதல். |
| CO3 | தமிழ்க் காப்பியங்களையும், இலக்கியங்களையும் அறியத் தூண்டுதல். |
| CO4 | இலக்கிய வரலாற்றையும், இக்கால இலக்கிய வகைமைகளையும் அறிதல். |
| CO5 | தமிழ் மொழியை இலக்கணத்தின் வாயிலாக பிழையின்றி அறிய துணை செய்தல். |
| CO6 | தற்காலப் படைப்பாளர்கள் மற்றும் படைப்பிலக்கியத்தை அறியும் திறனடைதல். |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 |  | 10 | 10 |  | 30 |
| CO2 | 10 | 20 |  | 21 |  |  | 51 |
| CO3 | 18 | 23 |  | 10 | 10 |  | 61 |
| CO4 |  |  | 10 |  |  |  | 10 |
| CO5 | 10 | 11 |  |  |  |  | 21 |
| CO6 |  | 7 |  |  |  |  | 7 |
|  | | | | | | | **180** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **23LN2004** | **Duration** | **3hrs** |
| **Course Title** | **தமிழ் - 2** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | கிறிஸ்தவ இலக்கியம் என்றால் எப்படி இருக்க வேண்டும் என்பதன் வரையறையை விளக்குக. | CO1 | R | 10 |
|  | b. | சிலம்பாட்டம் என்றால் என்ன? விளக்குக. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | பாரம்பரிய சிறுதானிய உணவு வகைகளை விவரி. | CO3 | R | 10 |
|  | b. | கரகம் அமைக்கப்படும் முறை பற்றி எழுதுக. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | குறிஞ்சிப் பாட்டின் நூல் விளக்கம் மற்றும் ஆசிரியர் பற்றிய தகவல்களோடு விளக்குக. | CO3 | U | 10 |
|  | b. | 1. ஒயிலாட்டம் என்றால் என்ன? 2. நான்கு நாள் திருவிழாக்களின் பெயர்களை விளக்கங்களுடன் கூறுக. | CO3  CO3 | R  U | 5  5 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | சூடுபட்ட புரோகிதர்கள் – கதையை விவரி. இக்கதையின் மூலம் நீ அறிந்து கொள்ளும் செய்தி யாது? | CO3 | An | 10 |
|  | b. | பாரதிதாசன் வழி நின்று தமிழின் இனிமை பற்றித் தொகுத்து எழுதுக. | CO2 | E | 10 |
|  |  |  |  |  |  |
| 5. | a. | வல்லெழுத்துகள் மிகும் இடங்களை உதாரணங்களுடன் தொகுத்து எழுதுக. | CO5 | U | 10 |
|  | b. | 1. கபிலர் – ஆசிரியர் குறிப்புத் தருக.  2. தெனாலிராமன் பற்றி குறிப்பு வரைக. | CO3  CO3 | R  R | 5  5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | புதுக்கவிதையின் தோற்றம் வளர்ச்சி பற்றி கட்டுரை வரைக. | CO6 | R | 10 |
|  | b. | புறப்பொருளின் இலக்கணம் மற்றும் அதன் வகைகளையும் விவரி. | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | 1. தமிழர்களின் திருவிழாக்களில் ஐந்தைக் கூறுக.  2. பாரதிதாசன் படைப்புகளில் ஐந்தனைக் கூறுக. | CO3  CO2 | U  E | 5  5 |
|  | b. | தமிழில் கிறிஸ்தவ இலக்கியங்கள் – கட்டுரை வரைக | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | அறத்தொடு நிற்றல் என்றால் என்ன? விளக்குக. | CO3 | An | 10 |
|  | b. | ஓடு ஓடு சங்கிலி கவிதையின் சாரத்தை கட்டுரை வரைக. | CO4 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | **1.** பொருத்துக   |  |  |  | | --- | --- | --- | |  | அங்கு, இங்கு பின் | தங்க மாங்கனி 108 | |  | விகடகவி | திருவிதாங்கோடு | |  | கிறிஸ்தவ தேவாலயம் | தெனாலிராமன் | |  | சூடுபட்ட புரோகிதர்கள் | சிற்பி | |  | எ + புத்தகம் | அதிசயக்குதிரை | |  | குதிரைப் படைத்தலைவன் | எப்புத்தகம் | |  | ஓடு ஓடு சங்கிலி | வல்லினம் மிகும் |   2. ஓரெழுத்து ஒருமொழி – வல்லினம் மிகுவதை எழுதுக. | CO5  CO5 | R  U | 7  3 |
|  | b. | தமிழர்களின் உணவு பற்றியத் தகவல்களைக் கட்டுரை வரைக. | CO3 | U | 10 |

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

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | கிறித்தவ இலக்கியம் பற்றியும், கிறித்தவ தமிழ்த் தொண்டர்களின் படைப்பாற்றல் பற்றி அறிதல். |
| CO2 | இருபதாம் நூற்றாண்டு படைப்பாளர்களின் புதுக்கவிதை நிலைப்பாடுகள், கற்பனை, உத்தி,  சமூகச்சிந்தனைகள், தீர்வுகள் போன்றவற்றை எடுத்து இயம்புதல். |
| CO3 | தமிழ்க் காப்பியங்களையும், இலக்கியங்களையும் அறியத் தூண்டுதல். |
| CO4 | இலக்கிய வரலாற்றையும், இக்கால இலக்கிய வகைமைகளையும் அறிதல். |
| CO5 | தமிழ் மொழியை இலக்கணத்தின் வாயிலாக பிழையின்றி அறிய துணை செய்தல் |
| CO6 | தற்காலப் படைப்பாளர்கள் மற்றும் படைப்பிலக்கியத்தை அறியும் திறனடைதல். |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 |  |  |  |  |  | 20 |
| CO2 |  |  |  |  | 15 |  | 15 |
| CO3 | 25 | 50 |  | 20 |  |  | 95 |
| CO4 | 10 |  |  |  |  |  | 10 |
| CO5 | 7 | 23 |  |  |  |  | 30 |
| CO6 | 10 |  |  |  |  |  | 10 |
|  | | | | | | | **180** |