R2831

Sub. Code
557201

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Artificial Intelligence and Data Science

DATA MINING AND WAREHOUSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is NOT a characteristic of OLAP? (CO1, K1)

   (a) Multidimensional Analysis

   (b) Real-time Transaction Processing

   (c) Aggregation

   (d) Roll-up and Drill-down

2. Fact tables contain: (CO1, K1)

   (a) Transactional Data

   (b) Dimensional Data

   (c) Metadata

   (d) OLAP Queries

3. Which of the following is an application area of data mining? (CO2, K2)

(a) Weather Prediction

(b) Medical Diagnosis

(c) Fraud Detection

(d) All of the Above

4. What is KDD in data mining? (CO2, K2)

(a) Knowledge Discovery in Databases

(b) Key Data Distribution

(c) Knowledge Data Development

(d) Key Database Deployment

5. The Pincer Search algorithm is related to : (CO3, K3)

(a) Text Mining

(b) Clustering

(c) Association Rules

(d) Neural Networks

6. What does the FP-Growth algorithm optimize in association rule mining? (CO3, K3)

(a) Rule Generation

(b) Tree Growth

(c) Partitioning

(d) Feature Selection

7. Which of the following is NOT a categorical clustering algorithm? (CO4, K5)

(a) ROCK

(b) CACTUS

(c) BIRCH

(d) CLARANS

8. What types of learning does clustering belong to? (CO4, K5)

(a) Supervised Learning

(b) Reinforcement Learning

(c) Unsupervised Learning

(d) Semi-supervised Learning

9. What is text clustering used for? (CO5, K4)

(a) Image Processing

(b) Natural Language Processing

(c) Time Series Analysis

(d) Statistical Analysis

10. Which of the following is NOT a web mining technique? (CO5, K4)

(a) Web Structure Mining

(b) Web Usage Mining

(c) Data Warehousing

(d) Web Content Mining

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) What is metadata in a data warehouse? Why is it important? (CO1, K1)

Or

(b) Describe the architecture of a data warehouse with a neat diagram. (CO1, K1)

12. (a) Explain the steps involved in Knowledge Discovery in Databases (KDD). (CO2, K2)

Or

(b) What are the challenges in Data Mining? Explain. (CO2, K2)

13. (a) Describe the Partition Algorithm and its significance. (CO3, K3)

Or

(b) Explain how Decision Tree Classification works with an example. (CO3, K3)

14. (a) Describe the K-Means Algorithm and its steps. (CO4, K5)

Or

(b) Explain how Genetic Algorithm (GA) is used in Data Mining. (CO4, K5)

15. (a) Explain different Text Clustering techniques. (CO5, K2)

Or

(b) How does Web Structure Mining help in analyzing websites? (CO5, K3)

Part C ($5 \times 8 = 40$)

Answer **all** questions not more than 1000 words each.

16. (a) Explain the Data Warehouse life cycle and its implementation. (CO1, K1)

Or

(b) Discuss the role of Data Warehousing in Government, Tourism, and Industry with examples. (CO1, K1)

17. (a) What are the current trends affecting Data Mining? Explain with examples. (CO2, K2)

Or

(b) Discuss various issues and challenges in Data Mining. (CO2, K2)

18. (a) Explain Bayesian classification and its applications in Data Mining. (CO3, K3)

Or

(b) How does Back Propagation work in Neural Networks? Explain with an example. (CO3, K3)

19. (a) Discuss various Hierarchical Clustering techniques with examples. (CO4, K5)

Or

(b) Describe how Clustering is used in real-world applications. (CO4, K4)

20. (a) How does Text Mining help in Business Intelligence? (CO5, K4)

Or

(b) Discuss the different types of Analytics and their applications. (CO5, K4)

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R–2832

Sub. Code
557202

M.Sc. DEGREE EXAMINATION, APRIL – 2025.

Second Semester

Artificial Intelligence and Data Science

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following questions type questions by choosing the correct option.

1. Which of the following is NOT a characteristic of an AI problem? (CO1, K1)

   (a) Well-defined problem space

   (b) Lack of a goal state

   (c) Use of heuristics

   (d) Constraint satisfaction

2. Which of the following is NOT an AI search technique? (CO1, K1)

   (a) Hill Climbing

   (b) Breadth-First Search

   (c) Constraint Satisfaction

   (d) Linear Regression

3. What is the key purpose of knowledge representation in AI? (CO2, K1)

(a) Storing large amounts of data

(b) Enabling reasoning and inference

(c) Increasing hardware performance

(d) Replacing human cognition

4. In predicate logic, what does a predicate represent? (CO2, K2)

(a) A constant value

(b) A relationship between entities

(c) A variable that stores knowledge

(d) A logical connector

5. What is the primary goal of machine learning? (CO3, K1)

(a) To store large datasets

(b) To enable machines to learn from data and improve performance

(c) To replace human cognition

(d) To develop expert systems

6. Which type of machine learning involves labeled data? (CO3, K4)

(a) Supervised learning

(b) Unsupervised learning

(c) Reinforcement learning

(d) Evolutionary learning

7. Which of the following is NOT a key step in preparing a machine learning model? (CO4, K3)

(a) Data preprocessing

(b) Model selection

(c) Ignoring missing values

(d) Model evaluation

8. What is the purpose of data preprocessing in machine learning? (CO4, K3)

(a) To make data more useful for model training

(b) To increase data complexity

(c) To remove irrelevant features

(d) Both (a) and (c)

9. Bayesian learning is based on which theorem? (CO5, K5)

(a) Central Limit Theorem

(b) Bayes Theorem

(c) Pythagorean Theorem

(d) Markov Theorem

10. Which of the following distributions is commonly used for modeling binary classification problems? (CO5, K5)

(a) Gaussian distribution

(b) Poisson distribution

(c) Bernoulli distribution

(d) Exponential distribution

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Compare and contrast the characteristics of production systems and search-based problem-solving approaches. (CO1, K4)

Or

(b) Explain how constraint satisfaction problems are solved using AI techniques. (CO1, K2)

12. (a) Explain the difference between procedural and declarative knowledge with examples. (CO2, K2)

Or

(b) What are the key challenges in knowledge representation in AI? (CO2, K2)

13. (a) Differentiate between human learning and machine learning. (CO3, K4)

Or

(b) How do overfitting and underfitting affect machine learning models? (CO3, K4)

14. (a) How does model selection impact the overall performance of a machine learning system? (CO4, K3)

Or

(b) Explain the key steps involved in model training and evaluation. (CO4, K3)

15. (a) Explain the role of probability in machine learning and how it is used in predictive modeling. (CO5, K5)

Or

(b) What is the importance of hypothesis testing in statistical analysis? Provide an example. (CO5, K5)

Part C $(5 \times 8 = 40)$

Answer **all** questions not more than 1,000 words each.

16. (a) Discuss the different problem-solving strategies used in AI with examples. (CO1, K4)

Or

(b) Explain the process of defining a problem as a state-space search. (CO1, K4)

17. (a) Discuss the significance of logic-based knowledge representation in AI applications. (CO2, K2)

Or

(b) Compare and contrast different types of reasoning strategies in AI. (CO2, K2)

18. (a) Explain the different types of machine learning with examples. (CO3, K4)

Or

(b) Discuss the ethical considerations in machine learning applications. (CO3, K4)

19. (a) Explain the process of preparing a machine learning model from data preprocessing to evaluation. (CO4, K3)

Or

(b) How does model interpretability impact the adoption of machine learning models? (CO4, K3)

20. (a) Evaluate the impact of probability distributions discrete and continuous in machine learning applications. (CO5, K5)

Or

(b) Explain the Monte Carlo approximation method and its significance in AI. (CO5, K5)

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R2833

Sub. Code
557203

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Artificial Intelligence and Data Science

WEB TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions by choosing the correct option.

1. Which tag do we use in HTML for inserting a line-break? (CO1, K1)

   (a) <a> (b)

   (c) <b> (d) <pre>

2. How to create an unordered list (a list with the list items in bullets) in HTML? (CO1, K1)

   (a) <i> (b)

   (c) (d)

3. Java Bean is a ———————— technology. (CO2, K1)

   (a) Component (b) Scripting

   (c) Middle tier (d) None

4. EJB applications are deployed on a ———————— compliant Application Server. (CO2, K1)

   (a) IEEE (b) J2EE

   (c) OSHA (d) SERI

5. Which method is used to initialize a servlet? (CO3, K1)

(a) init( ) (b) start( )

(c) initialize( ) (d) setup( )

6. What is a servlet in Java? (CO3, K1)

(a) A class that handles HTTP requests and responses

(b) A framework for building Java applications

(c) A database connection pool

(d) A method to process images in Java

7. Which of the following JSP elements is used to declare variables and methods? (CO4, K2)

(a) Scriptiet (b) Declaration

(c) Expression (d) Comment

8. Which method in JSP is used to handle form data submitted from a client? (CO4, K1)

(a) getParameter( ) (b) getData( )

(c) setParameter( ) (d) processRequest( )

9. Which of the following interfaces does JDBC provide for executing SQL queries? (CO5, K1)

(a) Statement (b) Result Set

(c) Connection (d) Prepared Statement

10. Which of the following JDBC classes is used to execute SQL queries and retrieve results? (CO5, K1)

(a) Connection

(b) Statement

(c) Prepared Statement

(d) Result Set

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Explain structure of HTML document with example. (CO1, K1)

Or

(b) Explain heading tag with example. (CO1, K1)

12. (a) What is a Java bean? List the advantages of Java bean. (CO2, K1)

Or

(b) Explain about the BDK introspection in detail. (CO2, K2)

13. (a) Explain the concept of session management in servlets. (CO3, K2)

Or

(b) List the advantages and disadvantages of using servlets in Java web development. (CO3, K2)

14. (a) Explain the concept of implicit objects in JSP. (CO4, K3)

Or

(b) What are JSP tags and explain the different types of JSP tags? (CO4, K1)

15. (a) How can you secure database interactions in JSP using JDBC? (CO5, K4)

Or

(b) Create a JSP page that updates an existing record in a database. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Define XML Declaration and mention its component. (CO1, K4)

Or

(b) Discuss Javascript objects in detail with suitable examples. (CO1, K4)

17. (a) Explain the bound properties and constrained properties. (CO2, K2)

Or

(b) Discuss about Java Beans API. (CO2, K2)

18. (a) How does servlet-based session management work and what are its limitations? (CO3, K2)

Or

(b) What are cookies in servlets, and how are they used for session management? (CO3, K2)

19. (a) With suitable example explain the anatomy of JSP page. (CO4, K3)

Or

(b) Explain Model-View-Controller (MVC) architecture in detail. (CO4, K1)

20. (a) Describe the process to connect to a MySQL database from a JSP page using JDBC. (CO5, K5)

Or

(b) Write a JSP page that connects to a database and displays all records from a table. (CO5, K5)

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R2834	Sub. Code
	557204

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Artificial Intelligence and Data Science

DESIGN AND ANALYSIS OF ALGORITHM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the question by choosing the correct options.

1. What type of data is commonly used in empirical analysis? (CO1, K1)

   (a) Theoretical models

   (b) Subjective opinions

   (c) Observed or measured data

   (d) Experimental data only

2. Which of the following is an example of a non-recursive algorithm? (CO1, K1)

   (a) Quick Sort

   (b) Merge Sort

   (c) Bubble Sort

   (d) Depth-First Search (DFS)

3. What is the main characteristic of a brute force algorithm? (CO2, K1)

   (a) It solves the problem by breaking it down into smaller subproblems

   (b) It tries all possible solutions to find the correct one

   (c) It uses dynamic programming to optimize performance

   (d) It focuses on reducing the input size to improve efficiency

4. Which of the following steps is typically involved in a divide and conquer algorithm? (CO2, K1)

   (a) Divide the problem into smaller subproblems

   (b) Solve the subproblems recursively

   (c) Combine the solutions of subproblems

   (d) All of the above

5. Which of the following is an example of a greedy algorithm? (CO3, K1)

   (a) Bellman-Ford algorithm

   (b) Dynamic Programming for Knapsack Problem

   (c) Kruskal's algorithm for finding the minimum spanning tree

   (d) Merge Sort algorithm

6. Which of the following algorithms is an example of dynamic programming? (CO3, K1)

   (a) Bellman-Ford algorithm

   (b) Dijkstra's algorithm

   (c) Floyd-Warshall algorithm

   (d) Kruskal's algorithm

7. Which of the following best describes the DFS algorithm in terms of search order? (CO4, K1)

   (a) It performs a "breadth-first" search by visiting all neighbors first

   (b) It explores as far down a branch as possible before backtracking

   (c) It picks the node with the smallest value and proceeds

   (d) It explores each node level by level

8. What is the main characteristic of the Breadth First Search (BFS) algorithm? (CO4, K1)

   (a) It explores a node, then recursively explores all its adjacent nodes before backtracking

   (b) It explores all nodes at the present depth level before moving on to nodes at the next depth level

   (c) It uses a stack to store nodes

   (d) It always finds the shortest path in a graph

9. Which of the following is a typical problem solved using backtracking? (CO5, K1)

   (a) Merge Sort

   (b) 0/1 Knapsack problem

   (c) N-Queens problem

   (d) Binary Search

10. In branch and bound, what is the role of the bounding function? (CO5, K1)

   (a) To provide an estimate of the cost or value of a solution

   (b) To compute the optimal solution

   (c) To divide the problem into smaller subproblems

   (d) To track the progress of the algorithm

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Give an non-recursive algorithm to find out the largest element in a list of numbers. (CO1, K4)

Or

(b) List the factors which affects the running time of the algorithm. (CO1, K2)

12. (a) Write the algorithm for Iterative binary search (CO2, K1)

Or

(b) What is the Quick sort? List out the Advantages of Quick Sort (CO2, K1)

13. (a) Show the general procedure of dynamic programming (CO3, K3)

Or

(b) How the operations performed in Strassen's Matrix multiplication? (CO3, K3)

14. (a) With suitable example explain insertion sort (CO4, K2)

Or

(b) Write a short note on presorting. (CO4, K2)

15. (a) What is Hamiltonian path? Generalize that Hamiltonian cycle is an undirected graph. (CO5, K2)

Or

(b) Using Back-Tracking enumerate how can you solve the 4- queens problem (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more 1000 words each.

16. (a) List out the Steps in Mathematical Analysis of Recursive Algorithms. (CO1, K1)

Or

(b) Write Algorithm using recursion that Fibonacci series. Determine the time and space complexity (CO1, K5)

17. (a) Write algorithm to find closest pair of points using divide and conquer and explain it with example (CO2, K5)

Or

(b) What is Convex hull problem? Explain the brute force approach to solve convex-hull with an example. Derive time complexity (CO2, K2)

18. (a) Write an algorithm for binomial coefficient computation and analyze the efficiency of algorithm (CO3, K5)

Or

(b) Describe Knapsack problem and Memory functions with example (CO3, K2)

19. (a) Explain the working principle of BFS (CO4, K2)

Or

(b) Write down the algorithm for generating combinatorial objects (CO4, K4)

20. (a) Explain the 8-Queen's problem using backtracking. Write the algorithms. Give the estimated cost for all possible solutions of 8- Queen's problem. (CO5, K5)

Or

(b) Write an algorithm for subset sum and explain with an example (CO5, K4)

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R2835	Sub. Code
	557556

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Artificial Intelligence and Data Science

Elective — BLOCK CHAIN TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Block chain is a type of (CO1, K1)

   (a) Distributed ledger technology

   (b) Client server

   (c) Centralized ledger technology

   (d) Physical ledger

2. To date, _____ is one of the slowest CrptoCurrency. (CO1, K1)

   (a) CORDA (b) Ethereum

   (c) Ripple (d) Bitcoin

3. Security tokens are also referred to as (CO2, K2)

   (a) Equity tokens (b) Utility tokens

   (c) Private tokens (d) Public tokens

4. This is used as a global payment settlement and asset exchange: (CO2, K1)

(a) Litecoin (b) Ripple

(c) Bitcoin (d) Ethereum

5. Bitcoin transactions are being registered into blockchain once in (CO3, K3)

(a) 10 minutes (b) 2.5 minutes

(c) 5 minutes (d) 30 seconds

6. Which of the following is not a characteristic of the Hash Algorithm? (CO3, K1)

(a) It has to be one-way

(b) It has to be two-way

(c) Fast Computation

(d) Avalanche Effect

7. As per BASE Theorem, letter E stands for (CO4, K2)

(a) Enhancement and consistency

(b) Event

(c) Enablement

(d) Eventual consistency

8. The mechanism used in a flight control system is (CO4, K1)

(a) State machine replication

(b) PAXOS

(c) PoW

(d) POI

9. This is about the safeguarding of user identity. (CO5, K2)

(a) Security (b) Privacy

(c) Mining (d) Hacking

10. Security is enabled in bitcoin through its _____ and _____ mechanisms (CO5, K3)

(a) Consensus and mining

(b) Mining and transaction pooling

(c) Consensus and confidentiality

(d) Key and signature

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Explain Blockchain Layers. (CO1, K3)

Or

(b) Describe the components of a blockchain network. (CO1, K3)

12. (a) Discuss the different types of blockchain networks. (CO2, K3)

Or

(b) How do public and private Blockchains differ in terms of access and control? (C02, K3)

13. (a) Explain the two types of nodes in an Ethereum network in detail. (C03, K3)

Or

(b) When is use permissionless blockchain used? Explain using a flowchart. (C03, K3)

14. (a) What are the problems in centralized servers? Explain in detail. (C04, K3)

Or

(b) Explain CAP theorem of distributed environment. (CO4, K3)

15. (a) Explain the various types of security attacks on blockchain. (CO5, K3)

Or

(b) Compare traditional security model vs blockchain security model. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Explain the concept of decentralization in blockchain technology. (CO1, K4)

Or

(b) Describe the working principles of Blockchain Technology. (CO1, K3)

17. (a) Discuss the different types of consensus mechanisms used in blockchain. (CO2, K4)

Or

(b) Explain the advantages and disadvantages of each consensus mechanism. (CO2, K4)

18. (a) Explain the concept of smart contracts in blockchain technology. (C03, K4)

Or

(b) Describe the characteristics and applications of smart contracts. (CO3, K4)

19. (a) Explain the three types of faults in a distributed environment. (CO4, K5)

Or

(b) Explain state machine with three states with the help of a diagram. (CO4, K5)

20. (a) Explain CIAR in detail. (CO5, K4)

Or

(b) Describe the Mixing/Barter transactions in detail. (CO5, K4)

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