M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Computer Science

DESIGN AND ANALYSIS OF ALGORITHMS

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

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

1. An —————— is defined as a set of well-defined instructions used to accomplish a particular task.

    (CO2, K2)

    (a) Algorithm   (b) Function

    (c) Program   (d) Procedure

2. —————— of an algorithm is the amount of time required for it to execute.   (CO1, K4)

    (a) Time complexity   (b) Space complexity

    (c) Compiling time   (d) Best case

3. Which of the following algorithm implementations is similar to that of an insertion sort? (CO1, K3)

(a) Binary heap   (b) Quick sort

(c) Merge sort   (d) Radix sort

4. What is the average case running time of an insertion sort algorithm? (CO3, K2)

(a) O(N)   (b) O(N log N)

(c) O(log N)   (d) O(N2)

5. Which of the following algorithms is an example of a greedy algorithm? (CO2, K3)

(a) Quick Sort

(b) Dijkstra's shortest path algorithm

(c) Bellman-Ford algorithm

(d) Kruskal's algorithm for minimum spanning tree

6. Which algorithm finds the solution for the single-source shortest path problem for a tree? (CO3, K5)

(a) Prim's   (b) Dijkstra's

(c) Kruskal's   (d) Huffman code

R0332

7. Which of the following is a dynamic programming problem? (CO3, K6)

   (a) Longest Common Subsequence

   (b) Binary Search

   (c) Depth First Search

   (d) Breadth First Search

8. The recursive versions of binary search use a —————— structure. (CO3, K2)

   (a) Branch and bound

   (b) Dynamic programming

   (c) Divide and Conquer

   (d) Simple recursive

9. —————— is an optimization technique for particular classes of backtracking algorithms that repeatedly solve sub-problems. (CO1, K5)

   (a) Decrease and conquer

   (b) Dynamic programming

   (c) branch and bound

   (d) Divide and Conquer

10. The Knapsack problem is an example of —————— (CO2, K5)

   (a) Greedy algorithm

   (b) 2D dynamic programming

   (c) 1D dynamic programming

   (d) Divide and conquer

R0332

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

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

11. (a) Explain how is an algorithm's time efficiency measured? (CO2, K3)

Or

(b) List out the characteristics of an algorithm. (CO1, K3)

12. (a) Explain divide and conquer method. (CO2, K3)

Or

(b) Give computing time for Binary search? (CO2, K5)

13. (a) Explain the greedy method. (CO3, K3)

Or

(b) Explain minimum cost spanning tree? (CO3, K2)

14. (a) List out the features of dynamic programming? (CO4, K3)

Or

(b) Write the general procedure of dynamic programming. (CO4, K5)

15. (a) Explain Backtracking technique. (CO5, K3)

Or

(b) Give solution to Hamiltonian circuit using Backtracking technique. (CO5, K6)

4

R0332

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

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

16. (a) Explain about algorithm with suitable example.

(CO1, K3)

Or

(b) Discuss Fundamentals of the analysis of algorithm efficiency elaborately.   (CO1, K2)

17. (a) Explain Merge Sort Problem using divide and conquer technique. Give an example.   (CO2, K3)

Or

(b) With a suitable algorithm, explain the problem of finding the maximum and minimum items in a set of n elements.   (CO2, K4)

18. (a) Explain in detail Minimum Cost Spanning Trees.

(CO3, K4)

Or

(b) Discuss the importance of Optimal Storage on Tapes.   (CO4, K6)

19. (a) Explain Travelling salesman problem.   (CO4, K3)

Or

(b) Explain 0/1 knapsack problem.   (CO4, K2)

R0332

20. (a) Explain P, NP and NP complete problems. (CO5, K4)

Or

(b) Explain the approximation algorithm for the travelling salesman problem. (CO5, K5)

————————

R0332

R0333		Sub. Code
		551102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Computer Science

ADVANCED DATABASE MANAGEMENT SYSTEMS

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

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

1.   What is the primary goal of the ER-to-Relational Mapping algorithm?   (CO1, K2)

   (a)   Data storage optimization

   (b)   Query performance improvement

   (c)   Data integrity preservation

   (d)   Data access control

2.   In the context of parallel database design, which type of parallelism focuses on executing multiple queries at the same time?   (CO1, K2)

   (a)   I/O Parallelism

   (b)   Intraquery Parallelism

   (c)   Intraoperation Parallelism

   (d)   Interquery Parallelism

3. What is the main purpose of normalization in database design? (CO2, K3)

    (a) Improve query performance

    (b) Reduce data redundancy

    (c) Increase data security

    (d) Enhance user interface design

4. In the context of functional dependencies, which normal form ensures that non-prime attributes are fully functionally dependent on the primary key? (CO2, K3)

    (a) 1NF   (b) 2NF

    (c) 3NF   (d) BCNF

5. What is the primary purpose of a commit protocol in distributed databases? (CO3, K4)

    (a) Ensure data encryption

    (b) Manage concurrency control

    (c) Guarantee transaction durability

    (d) Optimize query processing

6. Which aspect of distributed databases deals with how data is physically stored across multiple sites? (CO3, K4)

    (a) Distributed transactions

    (b) Concurrency control

    (c) Distributed data storage

    (d) Query processing

R0333

7. What is a key characteristic of spatial data in a spatial database? (CO4, K1)

   (a) Location or geometry information

   (b) Unstructured format

   (c) Textual descriptions

   (d) Temporal attributes

8. In spatial database queries, which technique is used to determine if one spatial object is completely contained within another? (CO4, K1)

   (a) Union operation

   (b) Spatial indexing

   (c) Topological relationship

   (d) Buffer analysis

9. What is the main purpose of recursive query processing? (CO5, K3)

   (a) Ensuring data consistency

   (b) Enforcing data security

   (c) Managing transaction logs

   (d) Handling complex queries

10. In deductive database systems, what role do facts play? (CO5, K2)

   (a) Facts are used to define database schemas

   (b) Facts are statements that express derived knowledge

   (c) Facts are used exclusively for data storage

   (d) Facts are related to security protocols

R0333

Part B   (5 × 5 = 25)

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

11. (a) Explain the basic concepts of Entity-Relationship (ER) modeling and how it is used in database design.   (CO1, K2)

Or

(b) Consider an existing ER diagram for a library database. Demonstrate how to map this ER diagram to a relational schema.   (CO1, K3)

12. (a) Explain Functional Dependency in the context of database normalization.   (CO2, K1)

Or

(b) Given a set of unnormalized data, perform the process of normalization up to 3NF.   (CO2, K4)

13. (a) Describe the architecture of a distributed database system.   (CO3, K2)

Or

(b) Compare and contrast two different distributed database commit protocols, such as 2PC (Two-Phase Commit) and Paxos.   (CO3, K5)

14. (a) Discuss the characteristics of spatial database.   (CO4, K1)

Or

(b) Design a spatial database schema for a GIS (Geographic Information System) that stores information about cities.   (CO4, K6)

4

R0333

15. (a) Explain the difference between propositional calculus and predicate calculus. (CO5, K4)

Or

(b) Evaluate the advantages and disadvantages of using recursive queries in deductive databases. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) Given a complex ER diagram for an e-commerce platform, perform the mapping to a relational schema using the ER-to-Relational Mapping algorithm. (CO1, K4)

Or

(b) Compare and contrast vertical and horizontal partitioning techniques in parallel database design. (CO1, K5)

17. (a) Consider a denormalized database schema. Perform the process of normalization up to BCNF. (CO2, K4)

Or

(b) Assess the impact of parallelism on query optimization in a distributed database environment. (CO2, K5)

18. (a) Explain the challenges and solutions associated with distributed database transaction management. (CO3, K4)

Or

(b) Compare the advantages and disadvantages of distributed databases versus centralized databases. (CO3, K5)

5

R0333

19. (a) Compare and contrast different spatial index structures, such as R-trees and Quad-trees. (CO4, K4)

Or

(b) Critically assess the role of spatial databases in urban planning and disaster management. (CO4, K5)

20. (a) Discuss the principles of deductive databases and their applications in real-world scenarios. (CO5, K4)

Or

(b) Evaluate the challenges and opportunities of implementing deductive databases for knowledge representation and reasoning. (CO5, K5)

————————

R0333

R0334

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Computer Science

DISTRIBUTED OPERATING SYSTEM

(CBCS – 2022 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 operating system is known for its open-source nature, extensive community support, and ability to run on a wide range of hardware architectures?

    (CO2, K2)

    (a) Android OS

    (b) Ubuntu

    (c) Google Chrome OS

    (d) Linux

2. In a distributed operating system, what is the primary goal of processor scheduling?   (CO2, K2)

    (a) Maximizing the throughput of the individual processors.

    (b) Minimizing the response time for user tasks.

    (c) Balancing the load across all processors.

    (d) Maximizing the utilization of network bandwidth.

3. What is the primary goal of recovery mechanisms in concurrent distributed systems? (CO3, K3)

(a) To ensure high system performance

(b) To prevent concurrent access to shared resources

(c) To maintain data consistency and system reliability

(d) To minize communication overhead

4. What is the primary purpose of check pointing in Distributed Database Systems? (CO1, K1)

(a) To recover from system crashes and ensure data consistency.

(b) To improve query performance in distributed data bases

(c) To distribute data across multiple servers.

(d) To encrypt data for security purposes.

5. What is the primary purpose of a Distributed File System in a Distributed Operating System? (CO3, K2)

(a) To improve CPU performance

(b) To enhance network security

(c) To provide a unified and transparent view of files across multiple machines

(d) To reduce power consumption in distributed systems

6. What is the primary goal of Distributed Scheduling in a distributed operating system? (CO3, K3)

(a) Minimizing energy consumption

(b) Maximizing single-node performance

(c) Balancing workload across multiple nodes

(d) Reducing network latency

R0334

7. What is the primary goal of Distributed Mutual Exclusion in a distributed operating system? (CO2, K3)

   (a) Minimizing energy consumption

   (b) Maximize system throughput

   (c) Ensure only one process accesses a critical section at a time across multiple nodes

   (d) Optimize load balancing across nodes

8. Which of the following is a characteristic o Non–Token Based Algorithms in distributed operating systems?

   (CO1, K3)

   (a) They use a centralized coordinator for resource access.

   (b) They rely on the passing of a special token among processes.

   (c) They prioritize processes based on their process IDs.

   (d) They achieve mutual exclusion without a predefined token.

9. What is the primary purpose of synchronization mechanisms in Distributed Operating Systems? CO3, K3)

   (a) To ensure efficient memory allocation

   (b) To prevent unauthorized access to system resources.

   (c) To facilitate load balancing across distributed nodes.

   (d) To improve network communication speed.

10. Which of the following is NOT a commonly used model for handling deadlock in distributed operating systems?

    (CO1, K3)

    (a) Resource Allocation Graph

    (b) Wait-Die

    (c) Wound-Wait

    (d) Two-Phase Locking

R0334

Part B   (5 × 5 = 25)

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

11. (a) "Explain the key functions of an Operating System in the context of a Distributed Operating System, highlighting how it manages resources and facilitates communication among distributed nodes. Provide examples to support your explanation.

                                    (CO1, K3)

Or

     (b) Explain the Critical Section Problem in distributed operating systems, and discuss the challenges involved in achieving mutual exclusion. Provide examples of synchronization mechanisms commonly used to address this problem and compare their advantages and disadvantages.   (CO1, K3)

12. (a) Explain the key principles and advantages of non-token-based algorithms in distributed operating systems. Provide an example of a non-token-based algorithm and discuss its application in ensuring mutual exclusion in a distributed system. (CO2, K3)

Or

     (b) Explain the concept of distributed deadlock detection in a distributed operating system. Provide a step-by-step explanation of how a distributed deadlock detection algorithm works, and discuss its advantages and limitations, use examples or diagrams where necessary to illustrate your points.

                                    (CO2, K2)

R0334

13. (a) Explain the concept of Distributed Shared Memory (DSM) in distributed operating systems. Provide at least two examples of how DSM can improve the performance and scalability of distributed applications. Discuss any potential challenges or drawbacks associated with implementing DSM in a distributed system. (CO3, K3)

Or

(b) Explain the role of communication protocols in distributed operating systems. Provide examples of at least two commonly used protocols in this context and describe their key characteristics. (CO2, K3)

14. (a) Explain the challenges of process synchronization in a distributed operating system. Provide examples of synchronization mechanisms commonly used in distributed systems and discuss their advantages and disadvantages. (CO4, K3)

Or

(b) Explain the key features and advantages of a Database Operating System (DBOS) in the context of distributed operating systems. Provide examples of situations where a DBOS would be beneficial, and discuss the challenges associated with implementing and managing such systems in a distributed environment. (CO4, K3)

R0334

15. (a) Explain the key challenges and strategies involved in memory management within a distributed operating system. Provide examples of how distributed memory allocation and synchronization mechanisms can enhance system performance.

(CO2, K3)

Or

(b) Discuss five key design issues that need to be considered when developing a distributed operating system. Provide a brief explanation of each issue and its significance in ensuring the efficiency and reliability of distributed systems. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Explain the role and significance of synchronization mechanisms in distributed operating systems. Discuss at least three different synchronization techniques commonly used in distributed systems, highlighting their advantages and disadvantages. Provide real-world examples to illustrate the practical applications of these synchronization techniques. (CO1, K3)

Or

(b) Discuss in detail the key functions and challenges of an operating system in a distributed operating system environment Provide examples to illustrate how these functions are crucial for managing resources and ensuring efficient communication in a distributed system. (CO1, K3)

6

R0334

17. (a) Explain the fundamental concepts of Lamport's Logical Clock, Vector Clock, Global State, and Cuts in the context of distributed operating systems. Provide examples to illustrate how these concepts are used to manage synchronization and coordination in distributed systems. (CO2, K3)

Or

(b) Explain in detail the concept of Token Based Algorithms in distributed operating systems. Discuss the advantages and disadvantages of using token-based algorithms for resource management and synchronization in distributed systems. Provide examples of scenarios where token-based algorithms are particularly useful and describe the challenges they may face in large-scale distributed environments. (CO2, K3)

18. (a) Explain the key principles and challenges associated with Distributed File Systems in a distributed operating system. Provide examples of distributed file systems and discuss how they address issues such as data consistency. fault tolerance, and scalability. (CO2, K1)

Or

(b) Explain the concept of Distributed Shared Memory (DSM) in distributed operating systems. Provide a detailed overview of how DSM works, its advantages, and challenges. Discuss the strategies used to maintain coherency in a distributed shared memory system and how they Impact system performance. (CO3, K3)

R0334

19. (a) Explain in detail the mechanisms used in distributed operating systems to achieve fault tolerance. Discuss at least three different mechanisms and their respective advantages and limitations. Provide real-world examples to illustrate the application of these mechanisms in ensuring system reliability and availability.

(CO4, K3)

Or

(b) Discuss the key challenges and considerations in designing a distributed scheduling algorithm for a distributed operating system. Provide examples of different scheduling algorithms and explain how they address these challenges. In your opinion, which scheduling approach would be most suitable for a distributed system in a cloud computing environment, and why? (CO4, K4)

20. (a) Explain the challenges and advantages of processor scheduling in distributed operating systems. Provide examples of different scheduling algorithms and discuss their suitability for various distributed computing scenarios. (CO5, K4)

Or

(b) Compare and contrast the key features of Android OS, Ubuntu, Google Chrome OS, and Linux operating systems in the context of distributed operating systems. Discuss their strengths and weaknesses in supporting distributed computing environments, and provide examples of scenarios where each OS excels or faces limitations. (CO5, K5)

———————

R0334

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Computer Science

ADVANCED JAVA PROGRAMMING

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

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

1.   Which design pattern ensures a class has only one instance and provides a global point of access to that instance?   (CO1, K1)

   (a)   Singleton Pattern

   (b)   Adapter Pattern

   (c)   Factory Method Pattern

   (d)   Command Pattern

2.   Which design pattern allows objects with incompatible interfaces to collaborate?   (CO1, K1)

   (a)   Prototype Pattern (b)   Proxy Pattern

   (c)   Mediator Pattern (d)   Decorator Pattern

3. In Java, which collection class allows duplicate elements and maintains the order of insertion? (CO2, K2)

(a) ArrayList   (b) HashSet

(c) TreeSet   (d) Linkedlist

4. Which interface in Java is used for sorting objects and is implemented by classes like TreeSet and TreeMap? (CO2, K2)

(a) Comparator   (b) Comparable

(c) ListIterator   (d) HashCode

5. What is the primary method used to draw graphics in a Java applet? (CO3, K4)

(a) paintComponent( )

(b) paint( )

(c) draw( )

(d) repaint( )

6. Which component class is commonly used to create dialog boxes in Java GUI applications? (CO3, K3)

(a) JOptionPane   (b) JDialog

(c) JWindow   (d) JFrame

7. Which layout manager is typically used to create a grid of components where each cell can contain one component? (CO4, K3)

(a) BorderLayout   (b) GridLayout

(c) FlowLayout   (d) CardLayout

R0335

8. In Java Swing, which class represents a tabbed pane that can hold multiple components with each component displayed in a separate tab? (CO4, K3)

   (a) JTabbedPane   (b) JTable

   (c) JTree   (d) JSlider

9. Which Java API is used to connect and interact with relational databases? (CO5, K5)

   (a) JPA   (b) JSP

   (c) JDBC   (d) JTA

10. What is the purpose of the JDBC 'ResultSet' interface? (CO5, K5)

   (a) To define database connection properties

   (b) To execute SQL queries

   (c) To represent the result set of a database query

   (d) To create a new database table

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

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

11. (a) Explain the Singleton design pattern in Java. Provide an example. (CO1, K2)

                    Or

    (b) Design a UML diagram for the Factory Method design pattern. Describe its components and how they interact. (CO1, K3)

R0335

12. (a) Compare and contrast the ArrayList and LinkedList classes in Java's Collection Framework.   (CO2, K2)

Or

(b) You are tasked with implementing a custom sorting logic for a list of objects. Describe how you would achieve this using Java's Comparator interface. (CO2, K4)

13. (a) Create a Java applet that draws a simple geometric shape of your choice. (CO3, K3)

Or

(b) Discuss the advantages and disadvantages of using Java applets for web-based applications.   (CO3, K5)

14. (a) Explain the role of layout managers in Java Swing. Compare and contrast various layout managers. (CO4, K5)

Or

(b) Create a Java Swing application that includes a JTabbedPane with multiple tabs. Each tab should contain different components. (CO4, K3)

15. (a) Describe the JDBC architecture and its components. (CO5, K2)

Or

(b) Design a Java application that interacts with a MySQL database. Explain the steps involved, from setting up the database to establishing a connection and executing queries. (CO5, K5)

4

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

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

16. (a) Compare and contrast the Factory Method and
          Abstract Factory design patterns in Java. Provide
          examples.   (CO1, K3)

                         Or

     (b) Design a Java application that demonstrates the
          Command design pattern.   (CO1, K6)

17. (a) Discuss the advantages and disadvantages of using
          HashSet   and   TreeSet   in   Java's   Collection
          Framework. Provide real-world use cases for each.
                                                 (CO2, K3)

                         Or

     (b) Develop   a   Java   program   that   uses   the
          PriorityQueue class to implement a priority-based
          task scheduler.   (CO2, K5)

18. (a) Design a Java applet that simulates a simple
          interactive game. Describe how the applet works.
                                                 (CO3, K4)

                         Or

     (b) Design a Java applet that simulates a simple
          educational activity. Describe how the applet works.
                                                 (CO3, K5)

R0335

19. (a) Provide a scenario for each layout manager in Java and demonstrate how it would be used effectively. (CO4, K4)

Or

(b) Create a Java Swing application for managing a personal address book. Implement a suitable layout manager for the user interface. (CO4, K4)

20. (a) Discuss the challenges and solutions related to handling transactions in JDBC-based applications. (CO5, K5)

Or

(b) Build a web-based e-commerce platform using Java and a relational database. Explain your architectural choices. (CO5, K5)

————————

R0336	Sub. Code
	551502

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Computer Science

Elective – **MOBILE APPLICATION DEVELOPMENT**

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective question by
Choosing the correct options

1. Why is Mobile Development Difficult?   (CO1, K1)

    (a) Mobile devices have limited hardware resources.

    (b) Mobile operating systems are simple and easy to work with

    (c) Mobile development tools are free and readily available,

    (d) Mobile users are less demanding than desktop users.

2. Importance of Mobile Strategies in the Business World
                                            (CO1, K1)

    (a) Mobile strategies are irrelevant in today's business landscape.

    (b) Mobile strategies are only important for large eneterprises.

    (c) Mobile strategies help businesses reach a broader audience and improve customer engagement.

    (d) reducing development costs.

3. Who Supports Android? (CO2, K1)

   (a) Android is supported solely by Google

   (b) Android is an open- source project with contribution from various organizations and developers.

   (c) Android is supported by Apple Inc.

   (d) Android is Supported by Microsoft Corporation.

4. Which of the following is correct? (CO2, K1)

   (a) Google Play is only available for iOS devices.

   (b) Google Play is platform for Android app distribution and can be accessed by Android developers.

   (c) Google Play is primarily a social media platform.

   (d) Google Play is a competitor to the Amazon Web Services (AWS) platform.

5. What is the primary platform for distributing iOS apps to iPhone users? (CO3, K1)

   (a) Google Play Store

   (b) Windows Store

   (c) Apple App Store

   (d) Amazon Appstore

6. In which section of iOS development would you typically find information about code optimization and fixing issues in your app? (CO3, K1)

   (a) iOS Project

   (b) Objective-C Basics

   (c) Building the Derby App

   (d) Debugging iOS Apps in iOS

R0336

7. What is one of the key benefits of using PhoneGap for mobile app development? (CO4, K1)

    (a) It is a native mobile app development framework.

    (b) It requires a separate codebase for each mobile platform.

    (c) It allows developers to write apps using only Swift or Java.

    (d) It enables cross-platform development using web technologies.

8. Which phase of mobile app development typically involves configuring platform-specific settings and plugins in a PhoneGap project? (CO4, K1)

    (a) History of PhoneGap

    (b) Getting the Tools You Need

    (c) PhoneGap Project

    (d) Building the Derby App in PhoneGap

9. Which integrated development environment (IDE) is commonly used with the Mono framework for developing cross-platform applications? (CO5, K1)

    (a) Eclipse

    (b) Visual Studio

    (c) Xcode

    (d) NetBeans

R0336

10. In the context of the Mono framework, what is the purpose of the "MonoDevelop" IDE?   (CO5, K1)

    (a) To develop iOS apps exclusively

    (b) To create Android apps only

    (c) To develop cross-platform applications with Mono

    (d) To develop web applications using JavaScript

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

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

11. (a) Assess the importance of mobile strategies in the business world.   (CO1, K5)

Or

    (b) Differ mobile web and mobile applications.(CO1, K4)

12. (a) What is plug–in? How to install eclipse in our system?   (CO2, K1)

Or

    (b) How offline storage helps to build the android application?   (CO2, K1)

13. (a) Recall anatomy of an iOS app.   (CO3, K1)

Or

    (b) Justify – "Craze on iPhone till date".   (CO3, K3)

4   R0336

14. (a) Difference between PhoneGap and HTML5.

(CO4, K4)

Or

(b) Recall the history of phonegap.   (CO4, K1)

15. (a) Compare mono and monotouch for android.

(CO5, K4)

Or

(b) How mono framework helps in development of mobile application?   (CO5, K1)

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

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

16. (a) Discuss in detail about mobile applications and its benefits.   (CO1, K2)

Or

(b) Describe about third-party frameworks in mobile application development.   (CO1, K2)

17. (a) Explain about GPS in detail.   (CO2, K2)

Or

(b) Explain the features of google play store? (CO2, K2)

18. (a) Distinguish iOS application to display "Hello World!".   (CO3, K4)

Or

(b) Create an iOS application to display "Hello World!"   (CO3, K6)

5   R0336

19. (a) Summarize about Appcelerator. (CO4, K2)

Or

(b) List down the tools that are needed for appcelerator titanium development. Explain. (CO4, K4)

20. (a) Describe about the Mono Framework. (CO5, K2)

Or

(b) Summarize building of the mobile application with Mono. (CO5, K2)

————————

R0336

R0337		Sub. Code
		551301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Computer Science

ADVANCED WEB TECHNOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objectives by
Choosing the correct options.

1. Which data type is used to represent whole numbers in JavaScript? (CO1, K2)

    (a) String (b) Boolean

    (c) Integer (d) Number

2. Which HTML tag is used to create an unordered list? (CO1, K2)

    (a) (b)

    (c) (d) <list>

3. What does introspection refer to in the context of PHP'? (CO2, K4)

    (a) Serializing PHP objects

    (b) Examining the properties and methods of objects at runtime

    (c) Extending a class

    (d) Querying a MySQL database

4. How can PHP be used to access a MySQL database?
                                          (CO2, K4)

    (a) By embedding SQL queries directly in HTML

    (b) By using the PHPMyAdmin tool

    (c) By utilizing MySQLi or PDO functions

    (d) By serializing database records

5. Which PHP extension is commonly used for parsing and manipulating XML data?   (CO3, K4)

    (a) MySQLi   (b) SQLite

    (c) JSON   (d) SimpleXML

6. When connecting to a database using PUP and AJAX, what is SQL injection?   (CO3, K4)

    (a) A method for securely transmitting data

    (b) A technique for optimizing SQL queries

    (c) An attack where malicious SQL code is injected into user inputs

    (d)   A protocol for database communication

7. Which Node.js module is commonly used to create an HTTP server?   (CO4, K4)

    (a) File System

    (b) URL

    (c) HTTP

    (d) NPM

R0337

8. What is one common use case for handling email in Node.js applications? (CO4, K4)

    (a) Generating dynamic HTML content

    (b) Managing HTTP requests

    (c) Sending email notifications

    (d) Parsing URLs

9. In Angular, what is the role of an NgModule? (CO5, K5)

    (a) Defining routes for the application

    (b) Creating components

    (c) Managing modules in the application

    (d) Configuring HTTP services

10. Which of the following directives is used to start angular JS application? (CO5, K5)

    (a) ng – repeat   (b) ng – init

    (c) ng – app   (d) ng – model

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

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

11. (a) Discuss HTML tags and attributes. (CO1, K3)

                    Or

    (b) Explain how JavaScript is used to find HTML elements. (CO1, K2)

3   **R0337**

12. (a) Describe various techniques and mechanisms used to maintain state in PHP. (CO2, K3)

Or

(b) Explain the role of constructors and destructors in PHP classes. With example. (CO2, K4)

13. (a) Describe the structure of an XML document and its use. (CO3, K3)

Or

(b) Provide a step-by-step explanation of how to perform AJAX validation using PHP. (CO3, K4)

14. (a) How do modules help in organizing and reusing code in Node.Js? (CO4, K3)

Or

(b) Explain the purpose of the URL module in Node.Js. (CO4, K4)

15. (a) Differentiate Angular JS and Angular in detail. (CO5, K4)

Or

(b) How can parent components communicate with child components in Angular? (CO5, K5)

R0337

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

Answer **all** questions note more than 1000 words each

16. (a) Explain the components of HTML and its role in structuring web content.   (CO1, K3)

Or

(b) Discuss the key principles and components of React Native that developers to create mobile applications.   (CO1, K2)

17. (a) Write the steps to create a class and an object in PHP.   (CO2, K3)

Or

(b) Provide examples of how PHP can be used to connect to a MySQL database, perform queries, and manipulate data.   (CO2, K4)

18. (a) Describe the process of connecting to a database using PHP and AJAX.   (CO3, K5)

Or

(b) Explore the process of handling XML data using PHP and AJAX.   (CO3, K4)

19. (a) Provide a step–by–step guide to uploading and using your own modules in a Node.js application.
          (CO4, K6)

Or

(b) Demonstrate how to work with Node.js and MySQL to access database.   (CO4, K4)

5

R0337

20. (a) Explain how to create and use an HTTP service in
Angular. (CO5, K4)

Or

(b) Discuss the key building blocks of an Angular
component. (CO5, K5)

_____

6

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Computer Science

IoT AND ROBOTICS

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

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

1.   What is a significant impact of IoT on industries and
      society?   (CO1, K2)

      (a)   Reduced efficiency in processes

      (b)   Increased manual labor

      (c)   Improved decision-making and efficiency

      (d)   Decreased use of data analytics

2.   Which of the following is a common challenge in the IoT
      ecosystem?   (CO1, K2)

      (a)   Seamless and secure connectivity

      (b)   Lack of interest from industries

      (c)   Inadequate data generation

      (d)   Low consumer demand

3. In IoT, what is the primary function of actuators?

(CO2, K1)

(a) Collecting environmental data

(b) Processing data locally

(c) Initiating physical actions or responses

(d) Storing data in the cloud

4. What is a crucial criterion for communication in IoT networks? (CO2, K1)

(a) Maximum power consumption

(b) High latency

(c) Scalability and low energy consumption

(d) Unlimited data storage

5. Why is optimization crucial when implementing the Internet Protocol (IP) for IoT applications? (CO3, K4)

(a) To increase data storage capacity

(b) To reduce IoT device costs

(c) To address specific IoT constraints and challenges

(d) To maximize device authentication

6. Which version of the Internet Protocol (IP) is designed to address the limitations of IPv4 and support the growing number of IoT devices? (CO3, K4)

(a) IPv2 (b) IPv4

(c) IPv6 (d) IPv8

R0338

7. When was the term "robot" first introduced, and by whom? (CO4, K5)

   (a) 19th century, Nikola Tesla

   (b) 20th century, Isaac Asimov

   (c) 20th century, Karel Capek

   (d) 18th century, Leonardo da Vinci

8. What is the primary function of actuators in a robot's anatomy? (CO4, K5)

   (a) Sensing the environment

   (b) Processing data

   (c) Initiating physical actions or movements

   (d) Storing data

9. Which type of drive system is commonly used in industrial robots due to its precision and versatility? (CO5, K6)

   (a) Electric   (b) Hydraulic

   (c) Pneumatic   (d) Mechanical

10. What is the primary function of control systems in robotics? (CO5, K6)

    (a) Power generation

    (b) Movement coordination

    (c) Sensing the environment

    (d) Cleaning and maintenance

R0338

Part B (5 × 5 = 25)

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

11. (a) Discuss the relationship between IoT and digitization. (CO1, K3)

Or

(b) Identify and analyze the key challenges and obstacles that the IoT ecosystem faces today.

(CO1, K2)

12. (a) How do sensor networks enable the collection of data from various physical sources? (CO2, K4)

Or

(b) Discuss the challenges and considerations in connecting smart objects in IoT. (CO2, K1)

13. (a) Explain the role of Internet Protocol (IP) in the network layer of IoT architectures (CO3, K4)

Or

(b) Discuss the key advantages of using Internet Protocol (IP) in IoT deployments. (CO3, K4)

14. (a) What are the essential components and subsystems that make up a robotic system? (CO4, K2)

Or

(b) Discuss the current state of the robotics market and its future prospects. (CO4, K5)

R0338

15. (a) Describe the role of drive systems in robotics.

(CO5, K4)

Or

(b) Explain the concept of dynamic performance and its significance in robot control. (CO5, K6)

Part C (5 × 8 = 40)

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

16. (a) Explore the primary drivers behind the adoption of IoT technologies. (CO1, K4)

Or

(b) Explain the components of an IoT architecture.

(CO1, K2)

17. (a) Explore the IEEE 802.15.4 standard and its relevance in IoT communication. (CO2, K3)

Or

(b) Explain the importance of the physical layer and MAC layer in IoT communication. (CO2, K1)

18. (a) Explain the different versions of the Internet Protocol. (CO3, K3)

Or

(b) Describe the strategies and techniques for optimizing the Internet Protocol (IP) for IoT applications. (CO3, K4)

5

R0338

19. (a) How do robotics systems contribute to automation in various industries? (CO4, K5)

Or

(b) Examine the role of programming in robotics. (CO4, K5)

20. (a) Discuss various types of sensors used in robotics and their applications. (CO5, K4)

Or

(b) Describe the programming methods and techniques use in Robotics. (CO5, K6)

————————————

R0338

R0339	**Sub. Code**
	551303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Computer Science

DATA ANALYTICS

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective questions by
Choosing the correct options

1.   What are the fundamental structures used in data
     analytics?   (CO1, K1)

     (a)   Data lakes and data marts

     (b)   Data warehouses and data cubes

     (c)   Data structures and data frames

     (d)   Data repositories and data pools

2.   In modern analytical architecture, what is the role of
     data visualization technologies?   (CO1, K1)

     (a)   Storing and managing data

     (b)   Processing data through algorithms

     (c)   Converting data into meaningful insights for
           decision-makers

     (d)   Collecting data from various sources

3. Which component of the big data ecosystem is responsible for storing vast amounts of data in a distributed manner?
    (CO2, K2)

    (a) Data analytics tools

    (b) Cloud computing platforms

    (c) Data warehouses

    (d) Distributed file systems

4. What is the role of Hadoop in the big data ecosystem?
    (CO2, K2)

    (a) Data visualization

    (b) Data preparation

    (c) Distributed data processing

    (d) Data warehousing

5. Which technique is used for dimensionality reduction in multivariate analysis?   (CO3, K2)

    (a) Decision trees

    (b) Clustering

    (c) Principal Component Analysis (PCA)

    (d) Regression

6. In support vector machines (SVMs), what is the role of the kernel function?   (CO3, K2)

    (a) To reduce dimensionality

    (b) To transform data into text

    (c) To map data to a higher-dimensional space

    (d) To remove outliers from the dataset

2

R0339

7. What role does Principal Component Analysis (PCA) play When combined with neural networks? (CO4, K2)

   (a) neural networks?

   (b) It increases model complexity.

   (c) It serves as a dimensionality reduction technique.

   (d) It encorces competitive learning.

8. How does fuzzy logic handle uncertainty and imprecision in data modeling? (CO4, K2)

   (a) By converting data to binary values

   (b) By using crisp sets to represent data

   (c) By assigning membership degrees to data points

   (d) By ignoring uncertain data

9. What is the purpose of applying filters to data streams in stream mining? (CO5, K4)

   (a) To amplify data volume

   (b) To reduce data quality

   (c) To focus on relevant data and discard noise

   (d) To increase data velocity

10. In a stream data architecture what component is responsible for collecting and storing incoming data? (CO5, K4)

   (a) Stream processor

   (b) Stream producer

   (c) Stream repository

   (d) Stream consumer

3

R0339

Part B (5 × 5 = 25)

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

11. (a) What are the fundamental structures and components involved in data analytics? Explain.
(CO1, K2)

Or

(b) Differentiate between Business Intelligence (BI) and Data Science. (CO1, K1)

12. (a) What are the primary drivers behind the explosion of big data in recent years? explain. (CO2, K2)

Or

(b) Explore the critical role of effectively communicating analytical results to stakeholders.
(CO2, K2)

13. (a) Discuss the challenges and techniques involved in analyzing and modeling nonlinear time series data.
(CO3, K4)

Or

(b) Discuss the importance of selecting the appropriate kernel function in SVMs. (CO3, K2)

14. (a) What is the relationship between Principal Component Analysis (PCA) and neural networks? Explain. (CO4, K4)

Or

(b) Explain the concept of fuzzy decision tress.(CO4, K2)

4

R0339

15. (a) Explain the significance of filtering in the context of data stream processing. (CO5, K3)

Or

(b) What are the common sampling techniques used to reduce the data volume while preserving essential information in a data stream? (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) What are the key considerations when working with data repositories. (CO1, K2)

Or

(b) Examine the components of a modern analytical architecture. (CO1, K1)

17. (a) Examine the components of the big data ecosystem. (CO2, K4)

Or

(b) Describe the stages of the data analytics lifecycle. (CO2, K2)

18. (a) Describe some algorithms used for rule induction and their applications. (CO3, K3)

Or

(b) Explain the concept of dimensionality reduction in multivariate analysis. (CO3, K2)

19. (a) Describe the process of extracting fuzzy models from data. (CO4, K5)

Or

(b) How do competitive learning algorithms help in clustering and pattern recognition tasks? Explain. (CO4, K2)

5 **R0339**

20. (a) Explain the stream data model and the architectural components required to process and analyze data streams. (CO5, K3)

Or

(b) Provide examples of Real–time Analytics Platform (RTAP) applications in different domains.

(CO5, K4)

––––––––––––

6

R0339

R0340	Sub. Code
	551304

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Computer Science

DEEP LEARNING

(CBCS – 2022 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 component of a neuron is responsible for receiving input signals from other neurons or external sources?

　　　　　　　　　　　　　　　　　(CO1, K4)

　(a)　Synapse　　　　(b)　Axon

　(c)　Dendrite　　　　(d)　Nucleus

2.　What kind of data is a single-layer Perceptron suitable for classifying?　　　　　(CO1, K4)

　(a)　Linearly separable data

　(b)　Non-linearly separable data

　(c)　Temporal data

　(d)　Image data

3. When applying transfer learning for image classification, what does fine-tuning refer to? (CO2, K4)

   (a) Refining the model architecture

   (b) Training a model from scratch

   (c) Adapting a pre-trained model to a new task with additional training

   (d) Freezing all layers except the output layer

4. In CNNs, how does a convolutional operation help in feature extraction from input data? (CO2, K4)

   (a) It compresses the data

   (b) It applies non-linear activation functions

   (c) It applies filters to detect local patterns

   (d) It performs global averaging of the data

5. Which step in the back propagation algorithm is responsible for calculating gradients and propagating them backward through the network? (CO3, K4)

   (a) Forward pass   (b) Initialization

   (c) Loss computation (d) Backward pass

6. In an MLP, what is the primary role of hidden layers?
   (CO3, K4)

   (a) To increase the computational speed

   (b) To store input features

   (c) To perform non-linear transformations and feature extraction

   (d) To calculate the output directly

R0340

7. In which application is bidirectional RNNs commonly used to improve performance? (CO4, K3)

   (a) Image classification

   (b) Speech recognition

   (c) Stock market prediction

   (d) DNA sequence analysis

8. In what type of data structures are recursive neural networks (RecNNs) particularly effective? (CO4, K3)

   (a) Images

   (b) Tabular data

   (c) Hierarchical or tree- structured data

   (d) Audio signals

9. Which deep learning technique is commonly used for object detection tasks in images? (CO5, K4)

   (a) LSTM   (b) CNN

   (c) RNN   (d) GAN

10. In the context of opinion mining, how do recurrent neural networks (RNNs) contribute to sentiment analysis?
                                                      (CO5, K4)

   (a) By generating opinionated text

   (b) By detecting named entities

   (c) By extracting sentiment and opinions from text data

   (d) By summarizing text documents

R0340

Part B   (5 × 5 = 25)

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

11. (a) Discuss the concept of Feed Forward Networks.
                                        (CO1, K4)

                      Or

    (b) Describe the steps involved in the backpropagation
        algorithm for updating network weights.   (CO1, K4)

12. (a) How do pooling layers help reduce spatial
        dimensions and enhance the invariance of features?
                                        (CO2, K4)

                      Or

    (b) Discuss the concept of deep recurrent networks and
        their ability to model long-term dependencies in
        sequential data.   (CO2, K4)

13. (a) How does gradient descent update the weights and
        biases in a feedforward network?   (CO3, K3)

                      Or

    (b) Discuss the trade-off between underfitting and
        overfitting in empirical risk minimization. (CO3, K4)

14. (a) Compare and contrast LSTMs and GRUs. (CO4, K4)

                      Or

    (b) Discuss the challenges associated with training
        deep recurrent networks.   (CO4, K3)

R0340

15. (a) How can deep learning models be applied to automate the identification of named entities in text? (CO5, K3)

Or

(b) Discuss the challenges and approaches in dialogue generation using LSTM models. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Explain the concept of a neural network's architecture. (CO1, K4)

Or

(b) Describe the key components of a Perceptron. (CO1, K4)

17. (a) Explain the key characteristics and components of Convolutional Neural Network (CNN) architectures. (CO2, K4)

Or

(b) Describe the steps involved in using transfer learning for image classification. (CO2, K4)

18. (a) Explain the role of hidden layers and activation functions in Multilayer perceptron. (CO3, K3)

Or

(b) Explain the architecture of an autoencoder. (CO3, K4)

5

R0340

19. (a) What is the fundamental idea behind bidirectional recurrent neural networks (RNNs)? Explain.
                                                (CO4, K3)

                        Or

    (b) How do Recursive Neural Network handle hierarchical or tree-structured data? (CO4, K3)

20. (a) Explain the use of LSTM models in converting video content to text descriptions. (CO5, K3)

                        Or

    (b) Explore the application of recursive neural networks (RecNNs) in parsing and sentiment analysis. (CO5, K4)

                    _____

R0340

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Computer Science

Elective – CYBER SECURITY

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

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

1. Where did the term "cybercrime" originate from?
(CO1, K2)

   (a) Ancient Greece

   (b) Renaissance art

   (c) Science fiction literature

   (d) World War II

2. Which legislation in India deals with cybercrimes and information security? (CO1, K2)

   (a) Indian Penal Code

   (b) Indian Cyber Security Act

   (c) Information Technology Act, 2000 (ITA 2000)

   (d) National Security Act

3. What is cybers talking primarily concerned with?

(CO2, K3)

(a) Promoting cybersecurity

(b) Illegally tracking and harassing individuals online

(c) Ethical hacking practices

(d) Environmental conservation efforts

4. What is a common use of botnets in the context of cybercrime? (CO2, K3)

(a) Promoting online education

(b) Conducting ethical hacking exercises

(c) Carrying out distributed denial of service (DDoS) attacks

(d) Environmental protection campaigns

5. What is a significant security challenge posed by mobile devices? (CO3, K3)

(a) They are impervious to malware

(b) They have limited storage capacity

(c) They can be vectors for data breaches and malware

(d) They are not suitable for business use

6. What is the role of authentication services in mobile device security? (CO3, K3)

(a) They are not relevant to mobile device security

(b) They ensure fast internet connectivity

(c) They help safeguard access to mobile devices and data

(d) They are used for mobile gaming

R0341

7. Which cybercrime technique involves deceptive emails or websites to trick individuals into revealing sensitive information?   (CO4, K4)

    (a) Steganography   (b) DoS attacks

    (c) Phishing   (d) Buffer overflow

8. What type of software records keystrokes and can be used for unauthorized surveillance in cybercrime?   (CO4, K4)

    (a) Encryption software

    (b) Antivirus software

    (c) Keyloggers

    (d) Firewall software

9. How do digital signatures contribute to the Indian IT Act and secure electronic transactions?   (CO5, K4)

    (a) They have no relevance to the Indian IT Act

    (b) They validate the authenticity and integrity of electronic documents and messages

    (c) They are only used for online gaming

    (d) They control access to social media platforms

10. What is the primary role of an IT security organization within a typical company?   (CO5, K4)

    (a) To promote online shopping

    (b) To develop mobile applications

    (c) To protect information systems and data

    (d) To provide customer support

R0341

Part B (5 × 5 = 25)

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

11. (a) What are the major challenges faced by organizations and governments in ensuring effective cybersecurity? (CO1, K2)

Or

(b) Explain the significance of the Information Technology Act, 2000 (ITA 2000) in addressing cybercrimes in India. (CO1, K2)

12. (a) Describe the common techniques used by cybercriminals to manipulate individuals through social engineering. (CO2, K3)

Or

(b) Analyze the relationship between cybercafes and cybercrimes. (CO2, K4)

13. (a) What security challenges do mobile devices pose to individuals and organizations? (CO3, K2)

Or

(b) What are the critical aspects of authentication service security in the context of mobile devices? (CO3, K3)

14. (a) Outline effective strategies for preventing and educating users about phishing threats. (CO4, K5)

Or

(b) Discuss the potential risks and impacts of buffer overflow attacks on software and systems. (CO4, K4)

4

R0341

15. (a) What are the consequences of not addressing the weaknesses and gaps in the Information Technology Act in India? (CO5, K2)

Or

(b) Explore the impact of cyberlaw, technology, and cybersecurity education on students in India. (CO5, K4)

Part C (5 × 8 = 40)

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

16. (a) Describe the different types of individuals or groups that engage in cybercriminal activities and their motivations. (CO1, K2)

Or

(b) Explain a detailed classification of cybercrimes with example. (CO1, K4)

17. (a) Explain the various steps involved in the planning of cyber attacks by criminals. (CO2, K3)

Or

(b) Explore the concept of cyberstalking and its impact on victims. (CO2, K4)

18. (a) What are the specific challenges and trends related to credit card fraud in the mobile and wireless computing era? (CO3, K2)

Or

(b) What measures should organizations adopt to handle mobile devices effectively and securely within their infrastructure? Explain. (CO3, K3)

5

R0341

19. (a) Explore the concept of steganography in cybercrime.
                                                        (CO4, K4)

                            Or

    (b) Analyze SQL injection attach and their significance
        in compromising database security.   (CO4, K5)

20. (a) What are the various career paths available in the
        field of cyber Security?   (CO5, K3)

                            Or

    (b) Describe the structure of an IT security
        organization within a typical company.   (CO5, K4)

                    ——————————

R0341