201CP24

ASSIGNMENT - 1
M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - I-DATABASE MANAG ENT SYSTEMS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) What are the main advantages of using the DBMS approach over traditional file processing systems?
b) Explain the classification of DBMSs and describe client/server architectures for DBMS.

2.
a) Define data abstraction and explain the three levels of database architecture with an example.
b) Discuss the roles and responsibilities of a Database Administrator (DBA).

3.
a) Explain the conceptual data model and relationship constraints in the ER model.
b) Illustrate an ER diagram for a University database, showing entities, attributes, and relationships.

4.
a) Describe the concepts of Specialization and Generalization. Compare their characteristics and constraints.
b) Explain how Union Types (Categories) are modeled in the EER diagram.

5.
a) Define Relational Schema and explain keys and integrity constraints with examples. (7M)
b) Write short notes on Tuple Relational Calculus and Domain Relational Calculus. (7M)

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ASSIGNMENT - 2
M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - I-DATABASE MANAG ENT SYSTEMS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) Write SQL statements for the following:
i) Create a database schema for an Employee system.
ii) Retrieve all employees with salary greater than 50,000.
iii) Display employees grouped by department with average salary.
b) Explain the role of triggers and views in SQL. Give examples.

2.
a) Explain Functional Dependencies with examples. How are they used in normalization?
b) Describe the properties of relational decompositions and explain lossless join decomposition.

3.
a) What is Boyce-Codd Normal Form (BCNF)? How does it differ from 3NF?
b) Explain Multivalued and Join Dependencies and how they lead to 4NF and 5NF.

4.
a) Explain the principles of schema design in MongoDB with a suitable e-commerce example.
b) Describe the aggregation framework in MongoDB and how it is used for analyzing order data.

5.
a) Discuss document updates, atomic operations, and delete mechanisms in MongoDB.
b) Write short notes on:
i) MongoDB collections and documents
ii) E-commerce query examples using MongoDB

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M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - II- DESIGN AND ANALYSIS OF ALGORITHMS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.a) Explain algorithm specification and asymptotic notations used for analyzing complexity.

b) Write short notes on elementary data structures: stacks, queues, and dictionaries.

2.a) Explain how trees and graphs are represented in memory.

b) Write algorithms for union and find operations on disjoint sets.

3.a) Describe the general method of divide and conquer. Write algorithms for binary search and merge sort.

b) Compare merge sort and quick sort in terms of time complexity.

4.a) Derive the recurrence relation for Strassen's matrix multiplication.

b) Explain selection and maximum–minimum algorithms with examples.

5.a) Explain the greedy method. Discuss its applications with examples.

b) Solve the "optimal storage on tapes" problem for program lengths (5, 10, 3).

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M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - II- DESIGN AND ANALYSIS OF ALGORITHMS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.a) Explain how the greedy method differs from dynamic programming.

b) Find the minimum cost spanning tree using Prim's and Kruskal's algorithms.

2.a) Describe the dynamic programming approach for computing all-pairs shortest paths.

b) Explain the concept of biconnected components and DFS traversal.

3.a) Write the dynamic programming formulation for the reliability design problem.

b) Explain how connected components and spanning trees are identified in a graph.

4.a) Write a branch and bound algorithm for the Traveling Salesman Problem (TSP).

b) Explain the role of bounding and pruning in branch and bound algorithms.

5.a) Write a backtracking algorithm for solving the sum of subsets problem.

b) Explain the differences between backtracking and branch and bound approaches.

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M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - III- SOFTWARE ENGINEERING

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) Define Software Process Framework. Explain its generic activities with a neat diagram.
b) Compare and contrast Waterfall, Spiral, and Agile models of software process.

2.
a) Explain the concept of Software Engineering Layers (Tools, Process, Methods, Quality Focus).
b) Describe the importance of Software Process Adaptation and discuss the Unified Process Model.

3.
a) What are Metrics in the Process and Project Domains? Explain with examples from real projects.
b) Discuss Software Measurement Principles and their role in project tracking and control.

4.
a) Explain the Role of a Project Manager in software project planning and control.
b) Discuss the W^6HH Principle proposed by Barry Boehm for project management and estimation.

5.
a) What is Requirement Analysis? Explain the activities and challenges in requirement elicitation.
b) Describe the Elements of the Analysis Model and how they assist design engineers.

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M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - III- SOFTWARE ENGINEERING

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.
a) Explain Object-Oriented Analysis (OOA) and its advantages over traditional analysis methods.
b) Describe Design Concepts such as abstraction, refinement, and modularity with examples.

2.
a) What are Architectural Patterns? Explain any two patterns used in software design.
b) Discuss User Interface Design Activities and the role of prototypes in UI development.

3.
a) Explain Architectural Design Evaluation Criteria in terms of performance, scalability, and maintainability.
b) Describe User Interface Evaluation Metrics such as learnability and efficiency.

4.
a) Explain Test Strategies for Object-Oriented Software with an example.
b) Describe the Levels of Testing — Unit, Integration, Validation, and System Testing.

5.

a) Explain the Cleanroom Software Engineering Process and how it achieves high reliability.
b) Write short notes on Testing for Specialized Environments (GUI, Client–Server, Real-Time).

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ASSIGNMENT - 1
M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - IV- COMPUTER NETWORKS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1.a). Discuss about Guided Transmission Media

b). Write about the data link layer design issues.

2. a). Describe goBack N Protocol

b). Explain about sliding window protocols.

3. a) Discuss Binary exponential backoff algorithm.

B Explain in detail about ALOHA

4. a). Explain about the 802.11 Architecture.

b). Explain Spanning Tree Bridges.

5. a). Explain Internet Gatway Routing protocol.

b). Explain Distance Vector Routing Algorithm.

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M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - IV- COMPUTER NETWORKS

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a). Discuss about Tunneling and Fragmentation.
   b). Distinguish connectionless services and connection-oriented services.

2. a). Discuss the architecture overview of WWW
   b). Discuss about remote procedure call.

3. a). Distinguish UDP and TCP protocol.
   b). Explain TCP Congestion Control.

4. a) Differentiate static web document and dynamic web documents.
   b) Explain about URL with examples.

5. a) Explain the mechanism of User Agents.
   b) List and explain various compression mechanism.

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ASSIGNMENT - 1
M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - V- WEB TECHNOLOGIES

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) Explain the use of images and frames in HTML with suitable code examples.
   b) Write an HTML code to design a registration form using text boxes, radio buttons, and submit button.

2. a) Explain how Cascading Style Sheets (CSS) enhance web page design.
   b) Write a JavaScript program to validate an email address entered by a user.

3. a) Explain the syntax and structure of a Document Type Definition (DTD) with an example.
   b) Write short notes on Document Object Model (DOM) in XML.

4. a) What is CGI scripting? Explain how HTML forms are processed using CGI.
   b) Discuss the methods provided by the CGI.pm module for creating dynamic HTML content.

5. a) Explain the architecture of JDBC and different types of drivers.
   b) Discuss the role of Prepared Statement and Callable Statement with examples.

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ASSIGNMENT - 2
M.Sc. DEGREE EXAMINATIONS, DECEMBER -2025

Second Semester

Computer Science
Paper - V- WEB TECHNOLOGIES

MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. a) What is network programming? Explain how to find IP address and host name using Java.
   b) Describe the use of URLs and URIs in Java networking.

2. a) Explain the directory structure of a Tomcat web server.
   b) Describe how Servlets handle initialization parameters and configuration.

3. a) Explain different methods available in Http Servlet Request and Http Servlet Response classes.
   b) Discuss common security issues in Servlets and measures to prevent them.

4. a) Explain the life cycle of a JSP and the problem it solves compared to Servlets.
   b) Discuss JSP scripting elements with syntax and examples.

5. a) Explain how to design JSP applications using MVC architecture.
   b) Describe the steps involved in installing JDK and testing the Tomcat server for JSP deployment.