

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-IV Computer Science & Business Systems : WINTER: 2025
SUBJECT: DATABASE MANAGEMENT SYSTEMS

Day : Thursday
Date : 27/11/2025

W-29286-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

NB :

1. Assume suitable data, if necessary.
2. Draw neat labelled diagrams WHEREVER necessary.
3. Figures to the right indicate FULL marks for the question.
4. All questions are COMPULSORY.

Q. 1 Explain the fundamental differences between a file system and a database system. What are the major advantages of using a database approach? (10)

OR

Q. 1 Describe with a neat diagram the over-all architecture of DBMS. Show all the components properly and explain the working of each block. (10)

Q. 2 Explain the roles of Data Definition Language (DDL) and Data Manipulation Language (DML) in database management. Provide syntax and examples of operations such as Create, Alter, Drop, Insert, Delete and Update. (10)

OR

Q. 2 Write a detailed note on Tuple Relational Calculus and Domain Relational Calculus. (10)

Q. 3 What is the significance of Functional Dependency. Also explain different types of Functional Dependencies such as trivial, non trivial, full and partial functional dependencies with suitable examples. (10)

OR

Q. 3 Explain update anomalies with examples. Also discuss the need for Normalization and different normal forms (1NF, 2NF, 3NF and BCNF). (10)

Q. 4 Explain how B-trees and Hashing techniques can be used for data storage in DBMS. (10)

OR

Q. 4 Draw block diagram of Query Processing. Explain the process of Query Processing in detail. (10)

Q. 5 Compare and contrast the following concurrency control techniques: (10)

1. Lock-based protocols
2. Timestamp-based protocols.

OR

- Q. 5 What is a deadlock? Consider the following set of operations from transactions T1, T2, and T3: (10)
- T1: lock-S(A), read(A), lock-X(B), write(B), unlock(A), unlock(B)
T2: lock-S(B), read(B), unlock(B)
T3: lock-X(A), write(A), unlock(A)
1. Draw the wait-for graph.
 2. Detect if there is a deadlock. If yes, suggest a recovery technique.

- Q. 6 Write a detailed note on: (10)
1. Data Warehousing.
 2. Data Mining.

OR

- Q. 6 Write a detailed note on Intrusion Detection and SQL Injection. (10)

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