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

Day : Thursday
Date : 29/05/2025

S-29286-2025

Time : 10:00 AM-01:00 PM
Max. Ma[illegible] 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 E-R diagram conventions. Draw an E-R diagram for application of your choice showing all E-R conventions, generalization/ specialization. Explain your diagram in detail using related conventions. (10)

OR

Q. 1 Explain following database models using suitable examples: (10)

1. Hierarchical.
2. Network.
3. E-R.
4. Relational.
5. Object Oriented.

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

OR

Q. 2 Discuss the key differences between open-source and commercial database management systems. Use MySQL, Oracle, SQL Server, and DB2 as examples to compare their features, cost models, and scalability. (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 Discuss Lossless and Dependency Preservation decompositions. Take suitable schemas as example for your demonstration. (10)

Q. 4 Define the different join strategies (nested-loop, sort-merge, hash join), Also explain where and which strategy is preferred and why. (10)

OR

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

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

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

OR

Q. 5 Explain two-phase locking (2PL). Show with an example how 2PL can avoid cascading rollbacks and ensure serializability (10)

Q. 6 Write a detailed note on the following models: (10)

1. DAC.
2. MAC.
3. RBAC.

OR

Q. 6 Write a detailed note on: (10)

1. Intrusion Detection.
2. SQL Injection.

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