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Question Paper Code : 40925

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Third/Fourth Semester

Computer Science and Engineering

CS 3492 – DATABASE MANAGEMENT SYSTEMS

(Common to : Computer Science and Design/Computer and Communication Engineering/Computer Science and Business Systems/Information Technology)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a data model? List the types of data model used.
2. List the aggregate functions supported by SQL.
3. Define single valued and multi valued attributes.
4. What is BCNF?
5. State the need for concurrency control.
6. Give an example for deadlock situation.
7. What are the advantages of B+ tree indexing?
8. Mention the use of query optimization.
9. Write the approaches for storing the relation in distributed data storage?
10. What is statistical database security?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail, the functions of DBMS.

Or

(b) Explain the various functions of advanced SQL features and embedded SQL with examples.

12. (a) Construct an ER diagram for Election Commission for online voting system as per the information in the system: Voters' details, candidates and the political party they belong or independent type, vote casted, winner of any particular election-area.

Or

(b) Illustrate how to preserve Functional Dependencies during decomposition.

13. (a) Write briefly about the states and desirable properties on transactions in a database.

Or

(b) Describe multiple granularity locking with an example.

14. (a) By considering relevant example, show insertion and deletion operations on a B-Tree.

Or

(b) Compare static and dynamic hashing techniques.

15. (a) Discuss in brief about different NOSQL databases.

Or

(b) Explain the purpose of role based access control in a database.

PART C — (1 × 15 = 15 marks)

16. (a) Consider the following relational schema (3+4+4+4)

Employee (empno,name,office,age)
Books(isbn,title,authors,publisher)
Loan(empno, isbn,date)

Write the following queries in relational algebra.

(i) Find the names of employees who have borrowed a book Published by McGraw-Hill.

(ii) Find the names of employees who have borrowed all books Published by McGraw-Hill.

(iii) Find the names of employees who have borrowed more than five different books published by McGraw-Hill.

(iv) For each publisher, find the names of employees who have borrowed.

Or

(b) Consider a relation with schema (3+4+4+4)

R(A,B,C,D) and FDs {AB -> C, C -> D, D -> A}.

(i) What are some of the nontrivial FDs that can be inferred from the given FDs?

(ii) What are all candidate keys of R?

(iii) Indicate all BCNF violations for R.

(iv) Decompose the relations into collections of relations that are in BCNF.
