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Question Paper Code : 81172

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Fourth Semester

Computer Science and Engineering

CS 3492 – DATABASE MANAGEMENT SYSTEMS

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

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Compare static SQL and dynamic SQL.
2. State about data abstraction.
3. What do you mean by trivial and multi valued dependencies?
4. Define join dependency.
5. Give the ACID properties.
6. Mention the role of checkpoint in recovery of transactions.
7. Assume the primary index exists for a file with 10,000 records of sizes 100 bytes each. The disk block size is 512 bytes (un-spanned allocation). The primary index record is of size 50 bytes. Calculate number of disk blocks accesses needed to retrieve a random record.
8. Define a B+-tree index.
9. State about SQL injection attack.
10. List the properties of a transaction.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the system structure of a Database System with neat block diagram.

Or

- (b) Discuss the UNION, INTERSECTION and MINUS operations in Relational Algebra by giving suitable examples.

12. (a) Describe the steps involved in lossless decomposition and illustrate them with an example.

Or

- (b) Identify the various functional dependencies and explain what will happen if these functional dependencies are not removed during logical database design process? Give appropriate example.
13. (a) Analyze the issue of deadlock in systems and discuss the strategies used to prevent and detect it.

Or

- (b) Illustrate the recovery techniques based on referred and immediate updates, and explain how each works with an example.
14. (a) Explain the different RAID architectures along with their merits and demerits.

Or

- (b) Demonstrate the query processing and optimization using heuristics and explain the algorithms involved in selection, sorting, and join operations.
15. (a) Discuss the issues related to concurrency during transaction processing and provide an example for each.

Or

- (b) Compare the different types of NoSQL databases, highlighting their structures and providing examples for each.

PART C — (1 × 15 = 15 marks)

16. (a) With relevant examples discuss the following in SQL
- (i) Data manipulation language (5)
 - (ii) Nested subqueries (5)
 - (iii) Views. (5)

Or

- (b) Design an ER diagram for the following scenario. ABC is a company with many employees. It increments the pay to the employees based on their experience and qualification. It provides life insurance to the employees 100% and to their family members 50%. It has various departments, the highest designated employees can be shifted to various departments based on the requirements. It offers loans to the employees and the EMI is extracted from their monthly salary.