

Roll No.

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B.Tech. (CSE) (Sem.-5)
DATABASE MANAGEMENT SYSTEMS

Subject Code : BTCS 501-18

M.Code : 78320

Date of Examination : 20-11-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. Explain how the ALTER command in DDL differs from the UPDATE command in DML?
- b. Describe the difference between the SELECT and PROJECT operations in relational algebra.
- c. What is the difference between "dense" and "sparse" indices?
- d. Describe the "two-phase locking" (2PL) protocol and its significance in ensuring serializability.
- e. What is SQL injection and how can it be used to compromise the security of a database?
- f. What is the main difference between an object-relational database and a traditional relational database?
- g. What is a CHECK constraint, and how does it differ from other integrity constraints like primary key and foreign key constraints?
- h. How does the JOIN operation in relational algebra differ from the JOIN in SQL?
- i. What are the advantages of using B-trees for indexing in databases?
- j. What is a serial schedule and why is it considered the safest type of transaction execution?

SECTION - B

2. Explain the concept of Data Abstraction and its levels and how it differs from Data Independence?
3. Explain the Armstrong axioms and their significance in functional dependencies.
4. Describe the process of insertion and deletion in a B-tree. How does the tree maintain its balance after these operations?
5. Explain the timestamp ordering protocol. How does it ensure serializability in a database system?
6. What is the difference between the strong entity set and weak entity set with the help of an example?

SECTION – C

7. Explain the concept of "hash collisions" in a hashing system. How are collisions handled in open addressing and separate chaining?

8. **Consider the following schema given. The primary keys are underlined:**

Sailors (sid:integer, sname:string, rating:integer, age:real)

Boats (bid:integer, bname:string, color:string)

Reserves (sid:integer, bid:integer, day:date) (*Composite Primary key will be used here*)

Write the queries in SQL:

- a) Write SQL queries for creating above tables.
 - b) Find the names and ages of sailors with a rating above 7.
 - c) Find the names of Sailors who have reserved a "red boat".
 - d) Find the names of Sailors who have reserved boat 108.
9. What is normalization? Explain different types of normalizations with the help of an example.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.