Professional Course (Odd) Examination, 2025

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

(Database Management System)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. Which of the following is not a component of DBMS?

(a) Query processor ( )

(b) Database engine ( )

(c) Database table ( )

(d) Indexing engine ( )

2. Database users who interact with the system without writing programs are called

(a) database administrators ( )

(b) casual users ( )

(c) application programmers ( )

(d) specialized users ( )

3. A one-to-many relationship is represented in an ER diagram by

(a) single line ( )

(b) double rectangle ( )

(c) 1: N notation ( )

(d) circle ( )

4. Attributes in an ER diagram are represented by

(a) rectangle ( )

(b) oval ( )

(c) diamond ( )

(d) triangle ( )

5. Functional dependency is represented as

(a) $X \leftarrow Y$ ( )

(b) $X \rightarrow Y$ ( )

(c) $X = Y$ ( )

(d) $X \leftrightarrow Y$ ( )

6. Cartesian product in relational algebra is denoted by

(a) σ ( )

(b) π ( )

(c) $\times$ ( )

(d) $\bowtie$ ( )

7. The operator used for pattern matching in SQL is

(a) = ( )

(b) LIKE ( )

(c) IN ( )

(d) BETWEEN ( )

8. Which of the following belongs to DCL (Data Control Language)?

(a) GRANT, REVOKE ( )

(b) SELECT, UPDATE ( )

(c) CREATE, ALTER ( )

(d) INSERT, DELETE ( )

9. The mechanism that maintains a record of changes for recovery is

(a) backup ( )

(b) authorization ( )

(c) encryption ( )

(d) logging ( )

10. Recovery in a multi-database system is difficult because

(a) all DBMS use the same schema ( )

(b) transactions may span multiple databases ( )

(c) no backup is needed ( )

(d) it avoids checkpoints ( )

II. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. The file-oriented approach provides better data consistency than database approach.

(T / F)

2. A one-to-many relationship means that one entity instance can be associated with many instances of another entity.

(T / F)

3. Tuple relational calculus is a procedural query language.

(T / F)

4. Aggregate functions like SUM() and AVG() can be used with GROUP BY.

(T / F)

5. Shadow paging maintains two copies of database pages for recover.

(T / F)

SECTION—II

(*Marks* : 10)

III. Answer the following short answer-type questions : 2×5=10

1. What are schemas and instances in a database?

2. Differentiate between specialization and generalization in the EER model.

3. Define primary key, candidate key and foreign key with examples.

4. Write the SQL command to create a table Student with attributes : RollNo (int, Primary Key), Name (VARCHAR(50)), Age (int).

5. Define database security. Why is it important?

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

IV. Answer the following questions : 10×5=50

1. Discuss the different types of DBMS (Hierarchical, Network, Relational, Object-oriented and Object-relational) with suitable examples. 10

OR

2. *(a)* Who are the different database users? Explain their roles with examples. 5

   (b) What are database constraints? Explain different types of constraints used in database design. 5

3. *(a)* Discuss superclasses, subclasses and inheritance in Enhanced ER (EER) model with examples. 7

(b) Draw and explain an ER diagram for a Library Management System showing books, students and issue details. 3

OR

4. Describe the characteristics of relations in RDBMS. Also explain different types of integrity constraints. 10

5. Define normalization. Explain step-by-step 1NF, 2NF, 3NF and BCNF with suitable examples. 10

OR

6. Explain Tuple Relational Calculus and Domain Relational Calculus with examples. Compare them with relational algebra. 10

7. What are joins in SQL? Explain INNER JOIN, LEFT JOIN, RIGHT JOIN and FULL JOIN with examples. 10

OR

8. Write SQL commands to perform the following : 10

(a) Create a table called Employee (EmpID, EmpName, Salary, Department).

(b) Insert two records.

(c) Update the salary of one employee.

(d) Delete one record.

(e) Drop the table.

9. Describe different backup mechanisms in database. Why are logging and checkpointing important? 10

OR

10. Discuss recovery techniques—Deferred update, Immediate update and Shadow paging with examples. 10

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