

2023

(4th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : DMS-401

(Database Management System)

Full Marks : 70 Pass Marks : 45%

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 45)

*The figures in the margin indicate full marks
for the questions*

1. (a) Design an ER diagram for banking enterprise. 5
- (b) What is a key? Explain the various types of keys. 4
- Or
- (c) Describe the three-schema architecture. Why do we need mapping between schema levels? 5
- (d) Discuss generalization, specialization and aggregation with an example. 4

2. (a) Explain any three relational algebra operators with an example. 5
- (b) Write the syntax and example for Delete and Drop. 4

Or

- (c) What are joins? Explain inner join and outer join for relational algebra. 5
- (d) Write SQL query for the following : 4
- (i) To create a table of hospital database with a minimum of 5 fields
- (ii) To insert two records
- (iii) To add a new field
- (iv) To display all records

3. (a) What problems are caused by data redundancies? Can data redundancy be completely eliminated when the database approach is used? 4
- (b) Normalize the table up to 2NF : 5
- Employee (eid, ename, phone, skill, salary, deptno, dept-name, jobno, job-title)

Or

- (c) Explain lossless join dependency with an example. 4

- (d) Given a relation $R(ABCD)$ and a functional dependency set :

$$F = \{AB \rightarrow CD, B \rightarrow C\}$$

Determine whether the given R is in 2NF. If not, convert it into 2NF. 5

4. (a) Explain various transaction operations. 4
- (b) What are the system logs used for? What are transaction commit points and why are they important? 5

Or

- (c) Discuss the failures that can occur with loss of non-volatile storage. 5
- (d) Describe how a non-recoverable situation could arise if write blocks are released after the last operations of a transaction but before its commitment. 4
5. (a) Explain the UNDO/REDO recovery algorithm. 4
- (b) How do we achieve concurrency control in a distributed database system? What should be the characteristics of a good concurrency control mechanism? 5

Or

(c) Differentiate between basic and strict two-phase locking.

4

(d) Discuss the problem that a phantom record can cause for concurrency control.

5

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(4th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : DMS-401

(Database Management System)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

**A. Choose the correct answer by putting a Tick (✓) mark
in the brackets provided : 1×10=10**

**1. In which of the following formats, data is stored
in the database management system?**

(a) Image ()

(b) Text ()

(c) Table ()

(d) Graph ()

2. What is information about data called?

(a) Hyper data ()

(b) Tera data ()

(c) Metadata ()

(d) Relations ()

3. The ability to query data, as well as insert, delete and alter tuples is offered by

(a) Transaction Control Language (TCL) ()

(b) Data Control Language (DCL) ()

(c) Data Definition Language (DDL) ()

(d) Data Manipulation Language (DML) ()

4. What is the function of the following command?

Delete from r where P

(a) Clears entries from relation ()

(b) Deletes relation ()

(c) Deletes particular tuple from relation ()

(d) All of the above ()

5. For designing a normal RDBMS, which of the following normal forms is considered adequate?

(a) 4NF ()

(b) 3NF ()

(c) 2NF ()

(d) 5NF ()

6. The database system must take special actions to ensure that transactions operate properly without interference from concurrently executing database statement. This property is referred to as

(a) atomicity ()

(b) durability ()

(c) isolation ()

(d) All of the above ()

7. The deadlock state can be changed to stable state by using _____ statement.

(a) Commit ()

(b) Rollback ()

(c) Savepoint ()

(d) Deadlock ()

8. There are two functional dependencies with the same set of attributes on the left side of the arrow

$$A \rightarrow BC$$

$$A \rightarrow B$$

this can be combined as

(a) $A \rightarrow BC$ ()

(b) $A \rightarrow B$ ()

(c) $B \rightarrow C$ ()

(d) None of the above ()

9. In a granularity hierarchy, the highest level represents the

(a) entire database ()

(b) area ()

(c) file ()

(d) record ()

10. Which of the following is a concurrency problem?

(a) Temporary update problem ()

(b) Incorrect summary problem ()

(c) Lost update problem ()

(d) All of the above ()

B. Indicate *True (T)* or *False (F)* by putting a Tick (✓)
mark : 1×5=5

1. Drop command is used to remove a relation from a database.

(T / F)

2. W-R conflict is also called as dirty read problem.

(T / F)

3. Each modification done in the database transaction is first recorded into the log.

(T / F)

4. The descriptive property possessed by each entity set is a model.

(T / F)

5. A set of possible values is called a pool.

(T / F)

C. Answer the following questions in short :

2×5=10

1. Why is the use of DBMS recommended?

(7)

2. What integrity rules exist in DBMS?

3. Illustrate functional dependency with an example.

4. What do you mean by concurrency control techniques?

5. Explain shared/exclusive locks.
