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MCS-207

**POST GRADUATE DIPLOMA IN
COMPUTER APPLICATIONS
(REVISED) (PGDCA-NEW)**

Term-End Examination

June, 2025

**MCS-207 : DATABASE MANAGEMENT
SYSTEMS**

Time : 3 Hours

Maximum Marks : 100

Weightage : 70%

Note : *Question No. 1 is compulsory and carries 40 marks. Attempt any **three** questions from Question Nos. 2 to 5.*

1. (a) A departmental store keeps the following information about its items and customers :

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P. T. O.

- The unique item identifier of each item
- The name of each item
- The price per unit of each item
- The number of units of each item in stock
- A unique customer number for each customer
- The phone number and address of each customer
- The list of items purchased by each customer along with quantity

Perform the following tasks for the description given above :

- (i) List all the entities. 2
- (ii) List the attributes of the entities. 2
- (iii) Identify relationships between/
among entities. 2

- (iv) List the primary key and foreign key constraints. 2
- (v) Draw the E-R diagram. 2
- (vi) Convert E-R diagram to relations. 2
- (b) Consider the following relations, where key attributes are underlined : 8

Member (memberID, name, phone)

Library (book_id, Title, first_author)

Issue (memberID, book_id, date_of_issue)

Write the SQL commands for the following queries on the relations given above :

- (i) Find the phone number of member(s) whose name is 'Rakesh Jain'.
- (ii) Find the title of all the books issued to a member whose ID is 'M001'.

- (iii) Count the number of books issued to each member.
- (iv) List all the books in the alphabetical order of book title.
- (c) Consider the following three transactions : $5+5=10$

T_A	T_B	T_C
READ A	READ B	READ A
$A = A + 100$	$B = B - 100$	$A = A + 200$
WRITE A	WRITE B	WRITE A

Assume that the three transactions T_A , T_B and T_C are executed concurrently. Show the execution schedules of these transactions for the following :

- (i) The schedule is serializable with transaction sequence T_A , T_C and T_B .
- (ii) The schedule which results in lost update problem.

- (d) What is data mining ? How is data mining useful for an organisation ? How is data mining different from knowledge discovery ? 4
- (e) Explain the following terms in the context of advanced database management systems : 6
- (i) Complex data types
 - (ii) ETL process of data warehouse
 - (iii) Geographic information systems
2. (a) Explain the role of Database Manager in the context of a DBMS. 5
- (b) What is a relational schema ? Explain with the help of an example. Define the terms super key, candidate key and primary key with the help of an example. 5
- (c) Explain the Cartesian product and theta join operations, in the context of relational algebra, with the help of an example of each. 5

- (d) What is hash file organisation ? Explain with the help of a diagram. 5
3. (a) What is Functional Dependency ? Explain with the help of an example. Explain the desirable properties of decomposition with the help of an example. 7
- (b) What is Multi-Valued Dependency (MVD) ? Explain with the help of an example. Explain how MVDs can be used to decompose a relation to 4NF with the help of an example. 7
- (c) What is SQL ? List the important features of SQL. Explain the CREATE TABLE command with the help of an example. 6

4. (a) Explain the concept of a transaction with the help of an example. What are the properties of a transaction ? Explain any *two* properties of a transaction. 7
- (b) What is a lock ? Why are locks used ? Explain the two phase locking protocol with the help of an example. 7
- (c) Explain the concept of backward recovery and forward recovery with the help of a diagram for each. 6
5. Write short notes on any *four* of the following : $4 \times 5 = 20$
- (a) Multimedia database and challenges in designing multimedia database
- (b) Knowledge databases
- (c) Star and snowflake schema in the context of data warehouse

- (d) Classification in the context of data mining
- (e) Use of checkpoint in database recovery
- (f) Nested queries in SQL
- (g) Enhanced E-R model

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