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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*

Weigtage : 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 :

- 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 : 4×5=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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