No. of Printed Pages : 7

MCS–207

POST GRADUATE DIPLOMA IN

COMPUTER APPLICATIONS

(REVISED) (PGDCA–NEW)

Term-End Examination

December, 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) Briefly explain the roles of Database Manager in the context of physical DBMS architecture. 5

   (b) Explain the following terms in the context of Relations : 5

   (i) Domain

   (ii) Tuple

   (iii) Candidate keys

   (iv) Entity Integrity constraint

   (v) Domain constraints

   (c) Given the following relational schema and set of dependencies, normalise the relation into second normal form. Also, find the primary key of student relation : 5

   Student (Enrolmentno, name, coursecode, coursename, grade)

   enrolmentno → name

   coursecode → coursename

   enrolmentno, coursename → grade

(d) What is the purpose of Data Definition Language (DDL) in SQL ? Explain the CREATE TABLE command of SQL with the help of an example. 5

(e) What is a transaction ? Define the properties of transactions. 5

(f) What is the purpose of log-file in the context of database recovery ? Explain with the help of an example. 5

(g) Explain the star schema of a data warehouse with the help of an example. 5

(h) What are the features of 'Document-based' NoSQL database ? Explain with the help of an example. 5

2. (a) Write the SQL commands for the following date queries : 10

Customer (customercode, name, pincode, phone)

Order (order_id, customercode, price)

(i) List all the customers whose Pincode is 110001.

(ii) Find the total number of customers.

(iii) Find the total of all the prices of a customer whose CustomerCode is 'C001'.

(iv) List the customercode, name, order-id of all the customers.

(v) Find the average price of all the orders.

(b) Define the third-normal form with the help of an example. 5

(c) Explain the concept of Multivalued dependency with the help of an example. 5

3. (a) Explain the different types of indexes used in file organization. How do index structures like B-trees or hash indexes enhance data access efficiency ? 10

(b) Discuss the Entity-Relationship (E-R) Model, focusing on its key components : entities, attributes and relationships. How does it aid in database design ? 10

4. (a) What is a transaction schedule in the context of concurrent transactions ?

Explain the following anomalies/ problems of concurrent transactions with the help of an example of each : 10

(i) Cost update anomaly

(ii) Unrepeatable read anomaly

(iii) Dirty read anomaly

(b) Explain the following authorisations on data items in a database system : 6

(i) READ

(ii) INSERT

(iii) UPDATE

(c) List the steps of query processing in the context of query processing and evaluation. 4

5. Write short notes on the following : 4×5=20

   (a) Complex data types in the context of object-relational database systems

   (b) Classification in the context of data mining

   (c) Graph-based NoSQL databases

   (d) Data fragmentation and replication in the context of distributed databases

× × × × ×