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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.*

B-1048/MCS-207

P. T. O.

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 $\rightarrow$ name

coursecode $\rightarrow$ coursename

enrolmentno, coursename $\rightarrow$ 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 data 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

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