POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA-NEW)

Term-End Examination

June, 2022

MCS-207 : DATABASE MANAGEMENT SYSTEMS

Time : 3 hours *Maximum Marks : 100*

(Weightage : 70%)

Note : *Question no.* ***1*** *is* ***compulsory****. Attempt any* ***three*** *questions from the questions no. 2 to 5.*

1. (a) Consider the following proposed system for a bank.

"A bank wants to store the following information of its customers using a database management system :

- Details of customer, where each customer is given a unique identifier. The bank stores the customer name, address and contact phone.
- The details of every account, where each account number is unique. In addition, the bank holds the account balance, type of account (like savings account or current account) and the customer identifier of the customers who own that account.
- An account may be a joint account of more than one customer. In addition, a customer can own many accounts.

Perform the following tasks for the description of the bank given above : *12*

(i) List all the entities, as per the description.

(ii) List the attributes of the entities.

(iii) List all the relationships between entities.

(iv) List all the constraints including primary and foreign keys.

(v) Draw an ERD for the above.

(vi) Convert the ERD into relations.

(b) Consider the following relations :

Student (enrol_no, name, course_code)

Course (course_code, title, duration)

Write SQL commands for the following queries : *8*

(i) Find the course_code and title of those courses, whose duration is more than one month.

(ii) List the title of the course taken by the student, whose enrol_no is 'S01'.

(iii) Count the number of all the courses.

(iv) List the enrol_no, name, title, duration for all the students.

(c) What are the problems of concurrent transactions ? Explain with the help of an example of each. *9*

(d) Explain the terms Data Mining and Data Warehousing. How is data warehousing related to database management system ? *8*

(e) Explain the concept of referential integrity with the help of an example. *3*

2. (a) Consider the relation :

$$R = \{A, B, C, D, E, F\}$$

and the set of functional dependencies

$$A \rightarrow BD; B \rightarrow E; D \rightarrow CF$$

(i) What is the key of R ? *3*

(ii) Decompose R into second normal form and third normal form. *5*

(b) What is the meaning of dependency preserving and lossless decomposition ? Explain with the help of an example of each. *8*

(c) What are the four properties of transactions in a database management system ? *4*

3. (a) What are the three levels of database architecture ? Explain the purpose of each level with the help of a diagram/example. *6*

(b) Explain using an example, how logs of a database system can be used for database recovery. Also define the concept of recovery in a database system. *7*

(c) Explain the features of object-oriented database management system. How is object-oriented database management system different from relational database management system ? *7*

4. (a) What is meant by the term "Query Optimisation" ? Explain with the help of an example. How is query optimisation different from query evaluation ? *7*

(b) Explain the concept of physical data independence and logical data independence with the help of an example of each. *6*

(c) Explain the concept of locking in RDBMS. How does locking solve the problems of concurrent transactions ? Explain with the help of an example. *7*

5. Explain the following terms with the help of an example : *5×4=20*

(a) Join Operation

(b) Weak Entity

(c) Primary and Secondary Index

(d) Deadlock

(e) Database Security