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MCS-207

**POST GRADUATE DIPLOMA IN
COMPUTER APPLICATION
(PGDCA-NEW)**

Term-End Examination

December, 2021

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 No. 2 to Question No. 5.*

1. (a) A university is planning to maintain the following details :

- A unique student identification.
- Name of the student.
- Programme code in which student has enrolled.

- Programme names of all the programmes.
- Programme duration.
- Programme fee.
- The contact phone number of the student.
- The fee paid by the student along with date of payment.

Perform the following tasks for the description given above :

- (i) List all the entities, as per the description. 2
- (ii) List all the attributes of the entities, as per the description. 2
- (iii) Relationship between/among the entities of the description given. 2
- (iv) Draw an ER diagram, as per the description given. 2
- (v) List all the constraints-including primary and foreign keys. 2
- (vi) Convert the E-R diagram to relations. 2

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- (b) Write SQL commands for the queries on the following relations : 8
- Account (account-number, name, balance)
- Bank (branch-code, account-number, phone)
- (i) List all the account numbers in the order of "name".
- (ii) Find the account-number, which has the highest balance.
- (iii) List the branch-code, account-number, name and balance of each account.
- (iv) Find the number of accounts in each branch.
- (c) Explain the term transaction in the context of database management system, with the help of an example. What are the problems associated when concurrent transactions are executed ? Explain any **one** of these problems with the help of an example. 10
- (d) Explain the relational model of database management system. Also, differentiate

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- between a relational database management system and an object oriented database management system. 8
- (e) Define the first normal form in the context of relational database management system. 2
2. (a) List and explain any **six** advantages of database management system. 6
- (b) What is the use of an index in RDBMS ? If two indexes were created in a database— one on primary key and other on secondary key, which of these two indexes will be of more advantage ? Justify your answer with the help of an example. 6
- (c) What is SQL ? Explain the create table command of SQL with the help of an example. 4
- (d) Explain the one-to-one and many-to-many relationship in ER-diagram. 4

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3. (a) What is lossless join decomposition of a relation ? Explain with the help of an example. 6
- (b) Explain the three level DBMS architecture with the help of a diagram. How does the three level architecture relate to data independence ? Explain with the help of an example. 8
- (c) Explain the second normal form and third normal form with the help of an example of relations. 6
4. (a) What is Data Recovery ? How can it be performed ? Explain with the help of an example. 6
- (b) Explain the term query optimisation in the context of a DBMS with the help of an example. 6
- (c) Consider the relation $R = \{A, B, C, D, E\}$ and the set of functional dependencies $A \rightarrow BC, B \rightarrow E, C \rightarrow D$
- (i) What is key in R ? 3
- (ii) Decompose R into 2NF and 3NF. 5

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5. Explain the following with the help of an example/diagram, if needed : 20
- (a) Data Mining
- (b) Data Warehousing
- (c) NoSQL databases
- (d) Locking in transaction
- (e) Weak entity

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