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MCS-023**M. C. A. (REVISED)/B. C. A. (REVISED)****Term-End Examination****June, 2021****MCS-023 : INTRODUCTION TO DATABASE
MANAGEMENT SYSTEMS***Time : 3 Hours**Maximum Marks : 100**Weightage : 75%***Note :** (i) Question No. 1 is compulsory.(ii) Attempt any **three** questions from the rest.

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1. (a) What are integrity constraints ? Discuss the entity integrity and referential integrity constraints with suitable example. 5
 - (b) Explain the three-level architecture of DBMS with the help of a diagram. 5
 - (c) Explain the concept 3rd normal form with the help of an example. 5

- (d) Consider the following three tables : 10
student (student_id, name, date_of_birth)
registers ((student_id, course_id)
course (course_id, course_title, credits)

Write the SQL commands for the following queries :

- (i) List all the courses in alphabetical order of course title.
- (ii) Make a list of students who have registered for course whose course_id is "MCS-23".
- (iii) Count the total number of students in each course.
- (iv) List all the courses whose credits are less than 4.
- (v) List all the students who have registered for more than one course.
- (e) What is a transaction in the context of DBMS ? Explain the properties of a transaction with the help of an example. 7
- (f) Differentiate between primary and secondary indexes in the context of file organisation. 3
- (g) Describe the utility of data replication in distributed DBMS with the help of an example. 5

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2. (a) Draw an ER diagram for the situation given below : 10
- “A company has many employees, working on several projects. A project is controlled by a manager who is an employee of the company.” Perform the following tasks for the description given above :
- (i) Identify entities, attributes, relationships, cardinalities, and draw an ER diagram.
- (ii) Convert the ER diagram into tables and show relationship among the tables as per the ER diagram.
- (b) Describe the relationship between data security and data integrity, with the help of a diagram. 5
- (c) Compare strong and weak entities in the context of ER diagram with the help of an example. 5
3. (a) What are concurrent transactions ? Briefly discuss the problems encountered by concurrent transactions. 10
- (b) Briefly discuss the term normalization in DBMS. Write statement for Second Normal Form (2NF) and discuss the insert, delete and update anomalies associated with 2NF. 10

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4. (a) Explain database recovery using system log, with the help of an example. Compare the backward recovery with forward recovery with the help of an example of each. 10
- (b) Discuss the role of database manager of a DBMS. Draw diagram to show the important components of database manager. Explain the role of each component shown in the diagram. 10
5. Explain any *five* of the following : 5×4=20
- (a) 2-phase locking protocol
- (b) Deadlock prevention protocol
- (c) Data fragmentation in DDBMS
- (d) Cartesian product and division operations in relational algebra
- (e) Inverted file organisation
- (f) Client-server databases

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