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MCS–023

MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)

Term-End Examination

December, 2023

MCS-023 : INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 75%

Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest.*

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1. (a) Justify the statement "Any relation in BCNF is in 3NF but converse is not true." Support your answer with the help of an example. 5

   (b) Compare object based data models with the record based logical data models. 5

(c) Briefly discuss the dirty read problem of DBMS with the help of a suitable example. 5

(d) Can we use Binary Search Trees (BST) for the purpose of indexing ? Justify. 5

(e) How do B-tree indexes differ from Binary search tree indexes ? 5

(f) Differentiate between logical data independence and physical data independence. 5

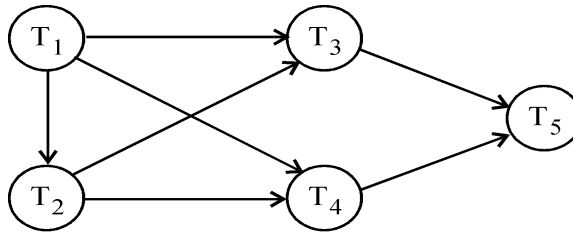
(g) Describe the relationship between data security and data integrity, with the help of a diagram. 5

(h) Differentiate between DBMS and RDBMS. Under what situation is it better to use file base system than database system ? 5

2. (a) Differentiate between Backward recovery and Forward recovery. 5

(b) Define a view in SQL. How does it differ from a table ? Write SQL syntax for creating a view. 5

(c) What is conflict serializability ? Explain. Consider the precedence graph of a schedule given below. Is the schedule conflict serializable ? Justify. 10



3. (a) Explain the concept of lossless decomposition and dependency preserving decomposition with suitable example for each. Is it always true that a lossless decomposition is dependency preserving too ? Justify with suitable example. 10

(b) What is Relational Algebra ? What is the utility of Relational Algebra ? Is SQL related to Relational Algebra ? Comment on it. Explain the following operations in the relational algebra with the help of an example for each : 10

(i) Select

(ii) Project

(iii) Join

4. (a) Discuss the term optimistic scheduling. How is this technique used to manage concurrent transactions in databases ? How does it differ from time stamping ? Give suitable example in support of your discussion. 10

(b) Differentiate between the following : 5 each

(i) Two-phase locking protocol and Two-phase commit protocol

(ii) Wait-wound protocol and Wait-die protocol

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

   (a) Deadlock avoidance protocols

   (b) Data fragmentation and its objectives

   (c) Problems of serial schedule and serializable schedule

   (d) Properties of Transactions in DBMS