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MCS-023

**MASTER OF COMPUTER
APPLICATIONS (MCA) (REVISED)**

Term-End Examination

June, 2024

**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.*

1. (a) Compare and contrast the traditional file based system with database approach. 5
- (b) What are the major components of database manager ? 5
- (c) What are candidate keys ? Explain with the help of an example. Can a candidate key be composite ? Justify your answer. 5

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- (d) Explain different relationship cardinalities with the help of an example of each. 5
- (e) Explain the select (σ) and project (π) operations of relational algebra with the help of an example database instance. 5
- (f) What is replication in a distributed database management system ? How is it different from fragmentation ? 5
- (g) Differentiate between serial schedule and serialisable schedule, with the help of an example. 5
- (h) How do B-tree indexes differ from Binary search tree indexes ? Explain with the help of an example. 5
2. (a) A supplier located in only one-city supplies various parts for the projects to different companies located in various cities. Draw the E-R diagram. Make suitable

- assumptions. Convert the E-R diagram into equivalent relational schema. 6
- (b) State entity integrity constraint and referential integrity constraint. 4
- (c) Compare and contrast 2NF and 3NF. Also discuss insert, delete and update anomalies with the help of an example relation. 10
3. (a) Explain lossless decomposition, with suitable example. 6
- (b) What is optimistic concurrency control ? Explain with suitable example. 6
- (c) Describe ACID properties of transaction in DBMS, with a suitable example. 8
4. (a) What is checkpoint ? Why is it needed ? How does a checkpoint help in recovery ? Also, differentiate between forward recovery and backward recovery. 10
- (b) Discuss the relationship between database security and database integrity. Draw suitable block diagram in support of your

discussion. Also, compare security measures taken at operating system level with that of the database security. 10

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

- (i) Wait for graph and its role in deadlock detection.
- (ii) Two phase locking (2PL)
- (iii) Wait-die Scheme for deadlock prevention.
- (iv) Advantages and disadvantages of Distributed DBMS