No. of Printed Pages : 4

MCS-023

MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)

Term-End Examination

June, 2023

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 File Base System with Database Management System. 5

   (b) Why is data replication useful in Distributed Database Management System (DDBMS) ? Briefly discuss the terms 'Complete Replication' and 'Selective Replication'. 5

(c) Briefly discuss the lost update problem with the help of a suitable example. 5

(d) Justify the statement "BCNF is stronger than 3NF". Give suitable example in support of your justification. 5

(e) What is Query Optimization ? Discuss the role of relational algebra in Query Optimization. 5

(f) What are integrity constraints ? Explain the various types of integrity constraints. 5

(g) How do strong entities differ from weak entities ? Discuss with the help of an example. Briefly discuss the role of keys in identification of entity type (i.e. weak and strong). 5

(h) Discuss the role of Database Administration. 5

2. (a) Differentiate between serial schedule and serializable schedule. 5

(b) Compare primary, secondary and clustering indexes. Which of these indexes are dense and which are not ? How is implementation of clustering indexes performed ? 10

(c) Explain log based recovery scheme with the help of an example. 5

3. (a) What do you understand by the term 'Normalization' in DBMS ? Write statement for second normal form (2NF), and discuss the insert, delete and update anomalies associated with 2NF. 10

(b) What do you understand by the term 'functional dependency' ? Explain the following functional dependencies, with suitable example for each : 10

(i) Full functional dependency

(ii) Partial functional dependency

(iii) Transitive functional dependency

(iv) Trivial functional dependency

4. (a) Compare shadow paging recovery scheme with the log-based recovery scheme in respect of ease of implementation and overhead cost. 8

   (b) Discuss different possible states of a transaction with the help of a diagram. 7

   (c) Discuss the utility of data replication and data fragmentation in Distributed Databases. 5

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

   (a) Deadlock prevention protocols

   (b) Precedence graph for serializability check

   (c) 2-tier client/server model

   (d) Integrity constraints and its types