MCS-023

M.C.A. (REVISED)/B.C.A. (REVISED)
Term-End Examination
June, 2020

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) Explain ANSI SPARC 3 level architecture of logical DBMS. What is the need for the three level architecture ? 5

(b) Describe the relationship between Data Security and Data Integrity, with the help of a diagram. 5

(c) Explain the terms BCNF and 3NF and verify the statement "any relation in BCNF is in 3NF but converse is not true."   5

(d) What do you understand by the term "data replication" ? Why is data replication useful in DDBMS ? Briefly discuss complete and selective replication.   5

(e) Draw an E-R diagram of a manufacturing company that makes various kinds of products. The company has several customers. Some of whom have offices in multiple locations. The customers place the order on the company for shopping products to different offices. Assume reasonable attributes for the entities.   5

(f) What are integrity constraints ? What for they are required in databases ? Briefly discuss the different types of integrity constraints.   5

(g) What are Indexes in DBMS ? What is the utility of Indexes in DBMS ? Under what situations B-tree Indexes are preferrable over Binary Search Tree Indexes ?   5

(h) What is the difference between strong and weak entities ? Specify strong and weak entities in the above E-R diagram.   5

2. (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 2 NF.   10

(b) What are concurrent transactions ? Briefly discuss the problems encountered by concurrent transactions.   10

3. (a) 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

(b) What is the role of Database Manager ? Explain the important components of database manager with the help of a diagram.   10

4. (a) What do you understand by the term functional dependency ? Explain the following functional dependencies :   10

   (i) Full functional dependency

   (ii) Partial functional dependency

   (iii) Transitive functional dependency

   (iv) Trivial functional dependency

   (b) Explain the following terms with suitable example :   10

   (i) Lossless decomposition

   (ii) Dependency preserving decomposition

5. Write short notes on the following :   20

   (i) 2-Phase locking protocol

   (ii) 2-Phase commit protocol

   (iii) Time-stamping protocol

   (iv) Checkpoints