

MCA (Revised) / BCA (Revised)**Term-End Examination****December, 2014****MCS-023 : INTRODUCTION TO DATABASE
MANAGEMENT SYSTEMS***Time : 3 hours**Maximum Marks : 100**(Weightage 75%)*

Note : *Question number 1 is compulsory. Answer any three questions from the rest.*

1. (a) What is SQL ? Explain its important features. 6
- (b) Let the transactions T1, T2 and T3 be defined to perform the following operations : 6
- T1 : Double A,
T2 : Add 2 to A,
T3 : Display A on screen and set A to 5.
- If the transactions T1, T2 and T3 are allowed to execute concurrently, and A is initialized to value 1, then how many possible correct results are there ? Enumerate them.

- (c) What is distributed DBMS ? List the issues involved in the design of a distributed DBMS. Also explain the features of distributed transaction with the help of an example. 8

- (d) Determine the output when the following operations are applied on relations R1, R2 and R3 given below : 8

R1 :

X	Y
A1	B1
A2	B2
A3	B3
A4	B4

R2 :

A	B
A2	B2
A6	B6
A7	B7
A3	B3

R3 :

A
—

→ Empty

- (i) Union ($R1 \cup R3$)
- (ii) Intersection ($R1 \cap R2$)
- (iii) Cartesian cross-section ($R1 \times R2$)
- (iv) Difference ($R2 - R1$)
- (v) Division ($R1 \div R3$)

- (e) What is a checkpoint ? Briefly explain its importance. 5
- (f) Prove the statement, "Any relation which is in BCNF is in 3NF but the converse is not true." 5
- (g) List any four responsibilities of a DBA. 2
2. (a) Explain Two-phase locking protocol with an example. 5
- (b) What is data integrity ? Does data integrity have any relationship with data security ? Justify your answer with the help of example and diagram. 7
- (c) What do you mean by fragmentation of a database ? What is the need of fragmentation in DDBMS environment ? Explain different types of fragmentation with an example of each. 8
3. (a) What is the role of Indexing in file organization ? Explain the following in relation to file organization, with the help of an example for each : 10
- (i) Primary Index
- (ii) Secondary Index
- (iii) Multilevel Indexing

- (b) Draw an E-R Diagram for the situation given below : 10

An organization needs to provide Medical facilities to its employees and their dependents. Organization is having a list of Doctors, Hospitals and Test centres for the employees facility. An employee may get Medical facility from the list of Doctors, Hospitals and Test centres provided by the organization to them. Employee does not need to pay anything for the facilities availed. The Doctors, Hospitals and Test centres directly raise their bill to the organization.

Note : *Make necessary assumptions wherever required for making E-R Diagram. Show clearly weak and strong entities and their relation in the system.*

4. (a) What is Functional Dependency ? Explain single-valued dependency with an example. 5
- (b) Explain Physical DBMS architecture with the help of a diagram. 7
- (c) Explain the following in brief : 8
- (i) Client-Server Databases
- (ii) Log-based recovery
5. (a) Explain the following with the help of an example : 8
- (i) Loss-less decomposition of database
- (ii) Deadlock and its prevention in database system

- (b) Write SQL statements to perform the following queries on the relations given below :

8

BOOK (Book_ID, Title, Publisher_ID,
Year_of_Pub, Price)
AUTHOR (Author_ID, Book_ID,
Author_Name)
PUBLISHER (Publisher_ID, Book_ID,
Address, Name_of_Pub, No._of_Copies)

- (i) Find the name of authors whose books are published by "ABC Press".
 - (ii) Find the name of the author and price of the book, whose Book_ID is '100'.
 - (iii) Find the title of the books which are published by Publisher_ID '20' and are published in year 2011.
 - (iv) Find the address of the publisher who has published Book_ID "500".
- (c) Explain the effect of a rollback operation with an example.

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