MCA (Revised) / BCA (Revised)

Term-End Examination

June, 2017

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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.

1. (a) Draw an ER diagram for the following situation :

   "An academic institution is affiliated to a University. The institution possesses several departments, each department offers several courses. Each department has its own infrastructure, where several teachers teach several students."

   Transform your ER diagram into Relational Database. *10*

   (b) "Any relation in BCNF is in 3NF, but the converse is not true." Justify the statement. *5*

(c) Perform Union, Intersection and Set Difference Operation on the following relations R_1 and R_2 : 6

R_1	
A	B
A_1	B_1
A_2	B_2
A_3	B_3
A_4	B_4

R_2	
A	B
A_1	B_1
A_7	B_7
A_2	B_2
A_4	B_4

(d) Consider the Relational Database Schema given below :

Employee (empcode, empname, empaddress, salary)

Department (deptcode, deptname, deptlocation)

Perform the following queries using SQL and Relational Algebra : 5

(i) Find details of the departments located in Delhi.

(ii) Find the names of employees whose salary is more than 4 lakhs per annum.

(e) What are integrity constraints ? Discuss the various types of integrity constraints that can be imposed on databases. 5

(f) How are database security and database integrity related ? Briefly discuss the different levels of security measures which may be considered to protect the database. 5

(g) Compare and contrast the Distributed databases with the Centralised databases. 4

2. **(a)** With the help of a suitable example, discuss the insertion, deletion and updation anomalies that can occur in a database. Briefly discuss the mechanism to remove such anomalies. *10*

(b) What do you understand by the term 'Transaction' in a database ? Discuss the properties of the transactions and explain the states through which a transaction passes during execution. *10*

3. **(a)** Write SQL commands for each of the following. Also illustrate the usage of each command through suitable example. *10*

(i) Creation of views

(ii) Creation of sequences

(iii) Outer join

(iv) To give access permission to any user

(b) Discuss the importance of file organisation in databases. Mention the different types of file organisations available. Discuss any one of the mentioned file organisations in detail. *10*

4. (a) Perform the following tasks for the relation R(A, B, C, D, E) whose functional dependency set (FD) is given below :

FD : {AB → C, C → D, D → A, BD → E}

   (i) Identify the candidate keys for the relation (R).

   (ii) Identify the highest normal form possessed by the relation (R). Justify your answer.

   (iii) Normalize the relation (R). *10*

(b) For what reasons is 2-phase locking protocol required ? Explain. Discuss the disadvantages of basic 2-phase locking protocol. List the ways and means that can be used to overcome the disadvantages. *10*

5. Write short notes on any *four* of the following : *4×5=20*

   (a) Optimistic Scheduling

   (b) 2-Phase Commit Protocol

   (c) Indexed Sequential File Organisation

   (d) Data Recovery Techniques

   (e) Serializable Scheduling