[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

DEC-23-1240

MCA-6102 (Database Management Systems)

MCA-1st CBCS/NEP

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note: Attempt five questions in all by selecting one question each from section A, B, C and D. Section-E is compulsory.

SECTION A

1. How the use of a DBMS overcomes the problem of the conventional file management system for an online banking application? Also analyse data independence in the context of designing a database for online banking with examples. (12)

OR

2. Draw an ER diagram that describes the following information. A company database stores information about the Employees (empid, designation, salary, address (work, home)). Departments (deptno, deptname and budget). It also stores Children of employees (name and age). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent is known. Only one parent (either father or mother) is working in the company. (12)

SECTION B

3. Given the following schema-student(regno, fname, lname, did, pid) and dept(did, dept_name, specialization, secretary_name, deanid) and dean(deanid, dean_name) and project(pid, ptitle). (12)

   a) Write a SQL query to find the regno, fname, lname of the students who are studying in CSE department.

   b) Write a SQL query to find the first name and the first character of the last name of the student.

   c) Write a SQL query to find the name of students who are studying in the ECE department with VLSI specialization.

   d) Write a SQL query to find the students name working in the project that contains the phrase 'Raspbery_Pi' or 'Robot' anywhere in the title.

OR

4. What is normalization? What are the different type of normalization? Find the normal form of the relation-R(A,B,C,D,E) with functional dependencies A→ BC, CD → E, B→D, E→A. (12)

SECTION C

5. What are the different concurrency problems in DBMS. Check whether the given schedule S is conflict serializable or not-S: $R_1(A)$, $R_2(A)$, $R_1(B)$, $R_2(B)$, $R_3(B)$, $W_1(A)$, $W_2(B)$. (12)

OR

6. Explain in detail about lock based concurrency control protocol in DBMS. What is Recoverable Schedules? What are the types of recoverable schedule? How can we check whether a schedule is recoverable or not? (12)

[P.T.O.]

SECTION D

7. What is the use of distributed data system? Differentiate between homogenous and heterogeneous distributed database. (12)

OR

8. Explain Client- Server architecture in DBMS. What is XML database? With example explain, how to store a student data using XML database. (12)

SECTION E (Compulsory) (6×2=12)

9. a. Differentiate single and multivalued attribute with example.

   b. What is participation constraint? Differentiate total and partial participation.

   c. What is 3-tier architecture in DBMS?

   d. What is the difference between candidate key and super key? Explain with an example.

   e. What is Thomas write rule in concurrency control?

   f. What do you mean by recoverable schedules?