USN [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]   **18MCA31**

Third Semester MCA Degree Examination, Feb./Mar. 2022
Database Management System

Time: 3 hrs.   Max. Marks: 100

Note: *Answer FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Briefly discuss the characteristics of database approach comparing with traditional file approach. **(08 Marks)**
   b. Describe Three-Schema architecture of DBMS with a diagram. **(08 Marks)**
   c. List and explain Actors on the scene. **(04 Marks)**

OR

2 a. Explain the types of attributes in ER model with example for each. **(06 Marks)**
   b. Explain Cardinality ratios for binary relationship with an example. **(04 Marks)**
   c. Design an ER diagram for car insurance company according to the requirements mentioned below.

   i)   The company keep track of customer information like id, name, address and phone.
   ii) Company stores the details of cars like registration number, engine number, model price, color etc that is owned by customers.
   iii) Company records accidents (if any) that each car has made using attributes like accident identifier, location, time and data of accident.
   iv) Company also maintains the license information of customers i.e., license number, issue date and expiry date.
   v)   Mention appropriate participation and cardinality ratio constraints. **(10 Marks)**

Module-2

3 a. Briefly explain Inner join and outer join with an example for each. **(10 Marks)**
   b. Explain SELECT and PROJECT operations with an example for each. **(04 Marks)**
   c. Briefly discuss on constraint violations on update operations. **(06 Marks)**

OR

4 a. Consider the following relation schema and answer the following queries using relational algebra:

   Department (Dnumber, Dname, MgrSSN, MgrStartdate)
   Project (Pnumber, Pname, Plocation, Dnumber)
   Employee (SSN, name, Bdate, addr, Sex, Salary, Superssn, Dno)

   i)   Retrieve the name and address of all employees who work for 'accounts' department.
   ii) Retrieve department number, number of employees, and their average salary.
   iii) Retrieve the name and salary of the manager of each department.
   iv) List the name and the location of the projects not controlled by department number '2'.
   v)   Retrieve all employees information who either work in department '1' and take salary more than Rs.20000 or work in department '3' and take salary more than Rs.29000. **(10 Marks)**
   b. Explain ER to relational mapping with suitable example. **(10 Marks)**

Module-3

5 a. What are Views? Briefly explain Views with example. (05 Marks)
 b. Illustrate the use of GROUP BY and HAVING clause with example. (05 Marks)
 c. Consider the following database schema. Write SQL queries for the following:
  Student (Sid, Sname, Major, GPA)
  Faculty (Fid, Fname, Dept, Designation, Salary)
  Course (Courseid, Cname, Fid)
  Enroll (Course_id, Sid, Grade)
  i) List the names of all students enrolled for course 'MCA'.
  ii) List all the department having an average salary of above 10000 rupees.
  iii) Give a 20% salary increment to all faculties.
  iv) List the names of all faculties beginning with 'N' and ending with letter 'R'.
  v) For each course, retrieve courseid and number of students enrolled for each course.
  (10 Marks)

OR

6 a. Briefly discuss on embedded SQL with an example. (08 Marks)
 b. What are correlated nested queries? Explain with example. (04 Marks)
 c. With the example explain following SQL commands:
  i) Alter ii) Update iii) Delete iv) Drop. (08 Marks)

Module-4

7 a. Define normalization. Explain 1NF, 2NF and 3NF with example for each. (10 Marks)
 b. List and explain informal design guideline for the relation schemes. (10 Marks)

OR

8 a. What is functional dependency? Explain with example. (04 Marks)
 b. Explain BCNF with an example. (08 Marks)
 c. Write a note on: i) Stored procedures ii) Triggers. (08 Marks)

Module-5

9 a. What are ACID properties? Explain in brief. (08 Marks)
 b. Define Transaction. Discuss Transaction states with a neat diagram. (08 Marks)
 c. List and explain Transaction isolation levels. (04 Marks)

OR

10 a. Define Locking. Explain different types of locks with example. (08 Marks)
 b. Briefly discuss on failure classification in recovery systems. (06 Marks)
 c. Write a note on 2PL. (06 Marks)

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