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Sr. No. of Question Paper : 902   **B**

Unique Paper Code   : 62341201

Name of the Paper   : Database Management Systems (DBMS)

Name of the Course   : B.A. (Prog.)

Semester   : II

Duration : 3 Hours   Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. The paper has **two** Sections. **All** questions in **Section A** are compulsory. Attempt any **five** questions from **Section B**. **All** parts of a question must be attempted together.

Section A

1. Answer the following questions :

(a) List any two types of database end users. Write two main activities for each.   (3)

(b) Illustrate insertion anomaly with the help of an example. (3)

(c) Consider a relation R (A, B, C, D) below : (3)

A	B	C	D
a1	b1	c1	d1
a1	b1	c1	d1
a2	b2	c2	d2
a2	b2	c2	d4

A → B, B → C are the functional dependencies satisfied by the given relation.

Which of the following functional dependencies hold true in the above-given relation R?

A → C,

{A, B} → C.

Justify your answer.

(d) Draw an ER diagram for the following application from the hospital database : (3)

- A doctor treats one or more patients.

- Each doctor has a unique Doctor_ID.

- Each patient has a Name, Phone_number, Address, and Date_of_birth.

- Consider Name as a composite attribute consisting of FName, MName, LName.

- Consider Address as a multivalued attribute.

- The Age of the patient is a derived attribute.

(e) Define a data dictionary with the help of an example. (2)

(f) What is the difference between DROP Table and DELETE Table commands in SQL? (2)

(g) What is meant by a recursive relationship type? Give an example of the recursive relationship type. (3)

(h) Write any three advantages of using a database over the traditional file processing system? (3)

(i) Refer to the EMPLOYEE relation given below to answer the following : (3)

EMPLOYEE (Name, Ssn, Bdate, Address, Gender, Salary, SuperSsn, Dno)

Write SQL queries for the following tasks.

    (i) Retrieve the names of employees who have no supervisors.

(ii) Give a 20 percent raise in salary to all employees.

Section B

2. (a) Describe the three-layered schema architecture of DBMS with the help of a block diagram.

(5)

(b) Illustrate entity integrity and referential integrity constraints. Explain with the help of an example each.

(5)

3. (a) Consider the following relation STUDENT: (5)

STUDENT

Name	Roll no	Marks	Course
Neha	1212	80	BA
Sam	1324	88	BSc
Harry	1423	90	BSc
Aarohi	1313	77	BA

Give the expected output of the given SQL commands based on the above relation STUDENT:

(i) Select MAX(Marks) from STUDENT;

(ii) Select * from STUDENT where Name LIKE 'H%';

(iii) Select COUNT (Distinct Course) from STUDENT;

(iv) Alter TABLE STUDENT ADD Email varchar(255);

(v) Select * from STUDENT where NOT Course = 'BA'

(b) Suggest appropriate datatypes for the following given attributes : (5)

(i) Marks of a student

(ii) Address of a student

(iii) Date of birth of a student

(iv) Roll Number of a student

(v) Grade of a student

4. (a) Consider the following relation : (5)

CAR_SALE(CarNumber, Date_sold, SalespersonNumber, Commission(%), Discount_amt)

The following functional dependency hold true for the relation.

SalespersonNumber ⟶ Commission(%)

Does this relation CAR_SALE satisfy 2NF? If not, convert it to 2NF.

(b) In the binary relationships given below, suggest the cardinality ratio. State the assumptions, if any.   (5)

Entity 1	Relationship	Entity 2
STUDENT	HAS	SOCIAL_SECURITY CARD
COURSE	REFERS	TEXT_BOOK
EMPLOYEE	WORKS_ON	PROJECTS
EMPLOYEE	SUPERVISES	EMPLOYEE
COUNTRY	RULED_BY	CURRENT_PRESIDENT

5. Define the following terms related to DBMS with the help of an example :   (10)

   (a) Entity

   (b) Entity Set

   (c) Multivalued attribute

   (d) Derived attribute

   (e) Composite attribute

6. (a) Define a Relation. Explain any four characteristics of a Relation in a database. (5)

(b) Write any two alternatives for specifying structural constraints on the relationship types in DBMS. (5)

7. Consider the following tables from COMPANY SCHEMA : (10)

Employee table.

Emp_Code	Emp_name	City	Designation	Salary(Rs.)	Dno
E201	Harish Singh	Delhi	Manager	98000	D1
E248	Amrita Sharma	Jaipur	Manager	89000	D2
E220	Satvik Gupta	Jaipur	Supervisor	78000	D2
E245	Apurv Sahni	Delhi	Manager	96000	D3
E296	Ajit Kakkar	Delhi	Assistant	48000	D3
E333	Shrijan	Delhi	Assistant	45000	D3

Department table.

Dept_No	Dept_Name	Location	Dept_Manager
D1	Research	Delhi	E201
D2	IT	Jaipur	E248
D3	Human Resource	Delhi	E245

Write SQL statements to perform the following tasks :

(i) Extract the details of all the employees who are working for the 'IT' department.

(ii) Count the number of employees working for the "Human Resource" department.

(iii) Insert a new employee, <'E424', 'Aarav Arora', Delhi, 'Manager', 67000, 'D1'>, in the database.

P.T.O.

(iv) Change the department of employee "Amrita Sharma" to D3.

(v) Remove details of an employee named "Ajit Kakkar" from the Employee table.

8. Consider a University Schema. It has the following four entities :   (10)

Course(<u>Courseno</u>, Coursename, Duration, prerequisite)
Department(<u>DeptNo</u>, Name, Location)
Student(Name, <u>StudentNo</u>, Date_of_birth, Course_no, Dept_no)
Teacher(<u>Teacher_id</u>, Name, Dept_num, Course_num, Email)

Draw an ER diagram for the given University Schema considering the following relationships and constraints :

- Each department has multiple teachers.

- A teacher belongs to only one department.

- Each department offers multiple courses.

- Many courses are taught by a teacher.

- A student may enroll for many courses offered by different departments.