# MCA SEMESTER I EXAMINATION 2024

## PAPER-MCA 103

## DATABASE MANAGEMENT SYSTEM

Time:-3 hours MM:60

### Section-A

Note: Answer all questions from this section and all carry equal marks (5marks)

| Q.N | Questions | CO | BL |
|---|---|---|---|
| 1 | What is Database Management System DBMS? Explain the advantages and disadvantages of using DBMS. | CO1 | L2 |
| 2 | What do you understand by Data Independence? Explain the difference between physical and logical data independence with examples. | CO1 | L2 |
| 3 | How does functional dependency play a role in the process of database normalization? Describe the different normal forms (1NF, 2NF, 3NF, BCNF) and how functional dependency is used to achieve each form. | CO1 | L3 |
| 4 | Discuss the concept of a candidate key in the context of functional dependencies. How do candidate keys differ from primary keys? Give examples that you have studied in class. | CO3 | L2 |

## Section B

Note: Answer any FOUR questions from section B and all carry equal marks(10marks)

| Q.N | Questions | CO | BL |
|---|---|---|---|
| 1 | What are weak and strong entities in ER Diagrams? Draw an ER Diagram for University environment. | CO3 | L3 |
| 2 | What do you understand by Entity Integrity and Referential Integrity Constraint? Explain them with proper examples. | CO2 | L2 |
| 3 | Discuss the ACID properties (Atomicity, Consistency, Isolation, | CO3 | L2 |

| | | | |
|---|---|---|---|
| | Durability) of a database transaction. Provide examples to illustrate each property. | | |
| 4 | For given Relation R(ABCDEFGH), Fields of R only contains atomic values and given functional dependencies are:<br>{CH->G , A->BC , B->CFH, E->A, F->EG}<br><br>How many candidates keys are there? Determine Prime and Nonprime attributes. Find the highest normal form of the relation. | CO3 | L4 |
| 5 | For given Relation R(Roll_number , Name , Date_of_birth , Age ) and given functional dependencies:<br>{<br>Date_of_birth ->Age, Age->Eligibility, Name->Roll_number , Roll_number->Name , Course_number->Course_name , Course_number->Instructor<br>}<br><br>Find the highest Normal form of the Relation. | CO3 | L4 |
| 6 | Consider the following relations:<br><br>Emp (empID, FirstName, LastName, address, DOB, sex, position, deptNo)<br>Dept(dtptNo, deptName, mgr, empID)<br>Proj (projNo, projName, deptNo)<br>Work on (empID, projNo, hours worked)<br><br>Write the SQL statements for the following:<br><br>(i) List the name and addresses of all employees who work for the IT department.<br>(ii) List the total hours worked by each employee, arranged in order of department number and within department, alphabetically by employee surname.<br>(iii) List the total number of employees in each department for those departments with more than 10 employees.<br>(iv) List the project number, project name and the number of employees who work on that project. | CO4 | L4 |