

SVKM'S NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2023-2024

Program: MCA

Subject: Database Management Systems

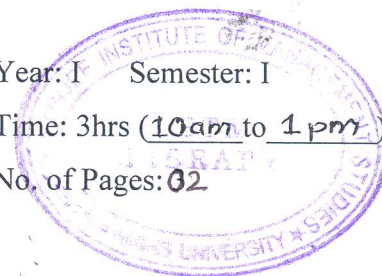
Date: 15/02/2024

Marks: 100

Year: I Semester: I

Time: 3hrs (10am to 1pm)

No. of Pages: 02



Re Exam

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) **In all 5 questions to be attempted.**
- 4) All questions carry equal marks.
- 5) **Answer to each new question to be started on a fresh page.**
- 6) **Figures in brackets on the right hand side indicate full marks.**
- 7) **Assume Suitable data if necessary.**

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|---|----|--|-------|
| Q1 | | Answer the following questions: | [20] |
| CO- 1; SO- 2; BL- 1,2 | A. | What are the advantages of DBMS over file system? | [5M] |
| CO- 2; SO- 2; BL- 1,2 | B. | List out DML commands and write their functionality with syntax. | [5M] |
| CO- 3; SO- 1; BL- 1,2 | C. | Explain BCNF in detail with example. | [5M] |
| CO- 4; SO- 7; BL-1 | D. | Explain ACID properties in a transaction. | [5M] |
| Q2 CO-1; SO-1; BL- 3,4 | A. | Consider a university database system designed to manage information about students, courses, and instructors. Design an Entity-Relationship (ER) diagram for the given scenario, taking into account the following entities: Student, Course, Instructor, and Enrollment. Each student can enroll in multiple courses, and each course can have multiple students enrolled. An instructor teaches multiple courses, and one instructor teaches each course. Assume necessary cardinalities wherever required. | [10M] |

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|--------------------------------------|----|--|-------|
| | B. | Reduce the above ER diagram into relational tables. Specify primary and foreign keys. | [10M] |
| Q3 CO-2; SO-2,7; BL-3,4,6 | A. | <p>Write SQL queries based on the following schema.</p> <p>students (student_id INT PRIMARY KEY, name VARCHAR(50), department VARCHAR(50), gpa DECIMAL(3, 2));</p> <p>departments (department_id INT PRIMARY KEY, department_name VARCHAR(50));</p> <ol style="list-style-type: none"> 1. To display the student IDs and names of students in the Computer Science department, ordered by last name. 2. To display average GPA for each department along with department name. 3. To display students with a GPA higher than the overall average GPA using a subquery. 4. To display the Count of the number of students in each department. 5. To display the names of students along with their corresponding department names using joins. | [10M] |
| | B. | Describe any 5 relational algebra operators with notation, syntax and example. | [10M] |
| Q5 CO-3; SO-1; BL-3,4 | A. | <p>Given Relation: R(A, B, C, D) and Functional Dependencies: F = { {A, B} → {C, D}, {C} → {A, B}, {D} → {B} }</p> <p>Find the highest normal form satisfied by the given relation. Justify your answer for normal form in detail.</p> | [10M] |
| | B. | Explain the concept of decomposition using functional dependencies. | [10M] |
| Q6 CO-4; SO-1; BL-1,3 | A. | Explain conflict serializability with example. | [10M] |
| | B. | What is a collection and document in MONGO DB? Explain operations insert and find in MONGO DB with syntax and example. | [10M] |
| Q7 CO-2,3,4; SO-1,6; BL-1,3 | A. | Write short notes on: | [4M] |
| | | 1. Total and Partial participation. | [6M] |
| | | 2. Super key, Candidate key and Primary key with example. | [6M] |
| | | 3. 3NF with example. | [4M] |
| | | 4. Characteristics of NOSQL Database. | |

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