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- (c) Explain schedule and its types. Given two schedules S1 and S2 which one is conflict serializable schedule. (CO5)

S1 : R1(X) R1(Y) R2(X) R2(Y) W2(Y)
W1(X)

S2 : R1 (X) R2(X) R2(Y) W2(Y) R1(Y)
W1(X)

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Roll No.

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**M. C. A./M. SC. (DATA SCIENCE AND
STATISTICS) (SECOND SEMESTER)
END SEMESTER**

EXAMINATION, June, 2023

DATABASE MANAGEMENT SYSTEM

Time : Three Hours

Maximum Marks : 100

- Note :** (i) All questions are compulsory.
(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
(iii) Total marks in each main question are **twenty**.
(iv) Each sub-question carries 10 marks.
1. (a) What is DBMS ? Discuss the advantage over the flat file system. What is the use of data dictionary in a database system ?
(CO1)
- (b) Explain several types of data models briefly. (CO1)

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- (c) Describe the three-schema architecture with suitable diagram. What is the difference between logical data independence and physical data independence ? Which one to achieve harder ? Why ? (CO1)
2. (a) What is an E-R Model ? Explain several types of attributes with examples. (CO2)
- (b) What do you mean by mapping cardinalities ? Explain Total participation and Partial participation. (CO2)
- (c) Design E-R diagram for a bank database schema and convert it into relation schema. What is the relational algebra ? Write the difference between cross join natural join, left outer join and right outer join with suitable example. (CO2)
3. (a) What is SQL ? Define its characteristics. Explain the several types of SQL commands (DDL, DML, DCL, and DQL). (CO3)

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- (b) Consider there are two tables EmpInfo and Position given below. (CO3)

EmpInfo

EID	Fname	Department	Project	Address	DOB	Gen
1	Sanjay	HR	P1	Hyderabad	01/12/1976	M
2	Ananya	Admin	P2	Delhi	02/05/1968	F
3	Rohan	Account	P3	Mumbai	01/01/1980	M
4	Sonia	HR	P1	Hyderabad	02/05/1992	F
5	Ankit	Admin	P2	Delhi	03/07/1994	M

Position

EID	Position	DOJ	Sal
1	Manager	01/05/2022	500000
2	Executive	02/05/2022	75000
3	Manager	01/05/2022	90000
2	Lead	02/05/2022	85000
1	Executive	01/05/2022	300000

- (i) Write a query to fetch the number of employees working in the department 'HR'.
- (ii) Write a query to find the names of employees that begin with 'S'.
- (iii) Write a query to fetch details of all employees excluding the employees with first names, "Sanjay" and "Sonia" from the EmpInfo table.

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- (iv) Write a query to find the name of employee whose getting salary > 90000 and Position of employee is Manager.
- (v) Write a SQL query to retrieve employee details from EmpInfo table who have a data of joining in the Position table.
- (c) Why do we use SQL constraints ? Which constraints can we use while creating a database in SQL ? What is PL/SQL ? Define stored procedure and trigger in SQL. (CO3)
4. (a) Define the minimal cover suppose a relating R (A, B, C) has functional dependency set $F = \{A \rightarrow C, B \rightarrow C, A \rightarrow C, AB \rightarrow B, AB \rightarrow C, AC \rightarrow B\}$ convert this FD set in Minimal Cover. (CO4)
- (b) Describe the use of normalization and explain 1NF, 2NF, 3NF with suitable a

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relation R (A, C, D, E, H) having two FD F and G as shown set :

$$F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$$

$$\text{set : } G = \{A \rightarrow CD, E \rightarrow AH\}$$

Are F and G equivalent ? (CO4)

- (c) What are the lossy and lossless decompositions ? Consider the two set FD

$$F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\} \text{ and}$$

$$G = \{A \rightarrow CD, E \rightarrow AH\} \text{ check whether they are equivalent. (CO4)}$$

5. (a) What is ACID Property ? During its execution, a transaction passes through several states until it finally aborts. List all sequences of state through which a transaction may pass. (CO5)
- (b) Explain the working of the locking technique in the concurrency control. What benefits does rigorous two-phase locking provide ? (CO5)

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