1901N1612   Candidate's Seat No : _____

MCA Sem-1 Examination
Relational Database Mgmt Systems
January-2024

Time : 3-00 Hours]

[Max. Marks : 50

Instructions: Draw Diagrams wherever necessary.
Make Assumptions wherever necessary.

SECTION - I

Q-1   Explain the following terms with an appropriate example: 9
    a. System Catalog
    b. Projection Operator
    c. Degree of a Relationship

Q-2   **Attempt the following :**   8
    a. Explain Record based data Models and discuss any one in detail
    b. Draw appropriate , well labelled and clean ER Diagram for the following
    There is an **IPL cricket** format, Assume that you are supposed to design the database for the same. Draw an ER diagram considering all the major entities and its dependency depiction. Plot all the related attributes and also show types of relationship. Try to keep the domain as wide as possible
    Document all assumptions that you make about the mapping constraints.

OR

Q-2   **Attempt the following :**   8
    a. Discuss the Native relational operators of relational algebra with appropriate examples
    b. Explain all the Armstrong's Axioms in detail with appropriate examples

Q-3   **Attempt the following**   8
    a. Discuss Three-tier Database Architecture with appropriate Diagram
    b. Explain 2PL in detail with appropriate example

OR

Q-3   **Attempt the following**   8
    a. Discuss various transaction states with diagram   3
    b. Assume the Database structure provided in the above ER Diagram scenario. Draw rough table structures and answer the following   5
    Relational algebra queries. (Plotting the tables also has marks)
        a. List names of cricketers who have scored maximum runs in last 1 year
        b. Display the bowler who has taken maximum wickets in past 1 year
        c. List the cricketers who were purchased for greater than 50,00,000 rs. For RCB Team
        d. List the won matches details captain wise (e.g <Dhoni> won <5> matches , <Pant> won <0> matches , so on and so forth....

P.T.o

SECTION - II

Q-4 **Explain the following Terms with an appropriate example.** **9**
   a. Dirty Read
   b. Shared Memory Architecture
   c. Log Tail

Q-5 **Attempt the following:** **8**
   a. In the Er diagram scenario provided in **Q2-b** above, Mention the **5** entities and attributues detailed in ER diagram. Consider that you have to convert the Relational schema in a normalised form. Plot the sample data first to the unnormalised structure and then show the normalisation steps with proper explanation of each normal form. Identify the Candidate keys. Document all the assumptions related to the schema. **3**
   Normalize the structure upto 3NF.
   b. Compare Mandatory Access Control Vs Discretionary control with appropriate examples

OR **8**

Q-5 **Attempt the following:**
   a. Explain various steps of Normalization with their purpose at each level
   b. Explain Aries Recovery algorithm

Q-6 **Attempt the following :** **8**
   a. Explain Wait-Die and Wound-wait deadlock prevention technique with example
   b. What is Bell La-Padula Protocol. Explain with reference to recovery

OR

Q-6 **Attempt the following :** **8**
   a. Define: Deadlock. What is deadlock prevention, deadlock detection and dead lock avoidance?
   b. Explain Backward-Recovery with appropriate example

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