

Cluster Innovation Centre, University of Delhi, Delhi-110007

Examination : End Semester Examination – Nov/Dec 2021
Name of the Course : B.Tech (Information Technology and Mathematical Innovations)
Name of the Paper : Handling Information through DataModelling
Paper Code : 32863103
Semester : III
Duration : 3 Hours
Maximum Marks : 75

Instructions:

This question paper contains six questions, out of which any four are to be attempted. Each question carries equal marks.

Q1. What is the use of SQL and NoSQL databases. When to use which one. Specify with scenarios.

Q2. A database is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Design an ER schema diagram for this application, stating any assumptions you make. Choose your favourite sport (e.g., soccer, baseball, football).

Q3. Consider the relation R, which has attributes that hold schedules of courses and sections at a university;

$R = \{\text{Course_no}, \text{Sec_no}, \text{Offering_dept}, \text{Credit_hours}, \text{Course_level}, \text{Instructor_ssn}, \text{Semester}, \text{Year}, \text{Days_hours}, \text{Room_no}, \text{No_of_students}\}.$

Suppose that the following functional dependencies hold on

$R: \{\text{Course_no}\} \rightarrow \{\text{Offering_dept}, \text{Credit_hours}, \text{Course_level}\}$

$\{\text{Course_no}, \text{Sec_no}, \text{Semester}, \text{Year}\} \rightarrow \{\text{Days_hours}, \text{Room_no}, \text{No_of_students}, \text{Instructor_ssn}\}$

$\{\text{Room_no}, \text{Days_hours}, \text{Semester}, \text{Year}\} \rightarrow \{\text{Instructor_ssn}, \text{Course_no}, \text{Sec_no}\}.$

Try to determine which sets of attributes form keys of R. How would you normalise this relation?

Q4. When is the concept of a weak entity used in data modeling? Define the terms owner entity type, weak entity type, identifying relationship type, and partial key.

Q5. Explain the difference between

- a) Weak Entity/ Strong Entity
- b) Primary Key/ Candidate Key
- c) Single Valued Attribute/ MultiValued Attribute
- d) Partial Participation/ Total Participation,
- e) 1:1 / M:N relationship

Q6. How are the OUTER JOIN operations different from the INNER JOIN operations? How is the OUTER UNION operation different from UNION?