SPRING MAKEUP MID SEMESTER EXAMINATION-2023

School of Computer Engineering
Kalinga Institute of Industrial Technology, Deemed to be University
Database Management System
[CS-2004]

Time: 1 1/2 Hours **Full Mark: 20**

All Questions are compulsory.
The figures in the margin indicate full marks. Candidates are required to give theiranswers in their own words as far as practicable and all parts of a question should beanswered at one place only.

1. Answer all the questions. [1 x 5]

   a) What is the dependency preservation property for a decomposition? Why is it important?

   b) Differentiate between weak entity set and strong entity set. How is weak entity set identified?

   c) Explain disjointness and completeness constraints on specialization.

   d) What are the rules that must be satisfied by the foreign key?

   e) Why SQL doesn't allow to compare an attribute value to NULL using = and <> operators – justify.

2.

   a. Draw the ER diagram for the ArtBase gallery:

   Galleries keep information about artists, their names (unique), birthplaces, age, and style of art. For each piece of artwork, the artist, the year it was made, its unique title, its type of art, and its price must be stored. Pieces of artwork are also classified into groups of various kinds, a given piece may belong to more than one group. Each group is identified by a name that describes the group. Finally, galleries keep information about customers. For each customer, galleries keep that person's unique name, address, total amount spent in the gallery, and the artists and groups of art that the customer tends to like.

   Make necessary assumptions. [3 Marks]

   b. Also, convert the above ER diagram into relational schemas and specify primary and foreign keys. [2 Marks]

3.

   a. Consider the relation R (A, B, C, D, E) and the set of functional dependencies A→BC, CD→E, B→D, E→A. Decompose R into 2NF and 3NF relations. [3 Marks]

   b. Consider two sets of functional dependencies F1={A→C, AC→D, E→AD, E→H} and F2={A→CD, E→AH}. Are they equivalent? [2 Marks]

4. Consider the COMPANY database schema:

Employee (ssn, fname, lname, bdate, address, gender, salary, super_ssn, dno)

Department (dno, dname, mgr_ssn, mgr_start_date)

Dept_Location (dno, dloc)

Project (pno, pname, plocation, dno)

Works_On (essn, pno, hours)

Dependent (essn, dependent_name, gender, bdate, relationship)

Solve the following querie using relational algebra expressions. [1 Mark X 5]

a. List the names of all employees who have a dependent with the same first name as themselves.

b. Find the names of employees who are supervised by ' Rakesh'.

c. Retrieve the names of all employees who work on every project.

d. Retrieve the average salary of all female employees.

e. List the last names of department managers who have no dependents.

*** Best of Luck ***