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FOURTH SEMESTER *B.TECH (CSE)*

MID SEMESTER EXAMINATION *(MARCH-2018)*

CO 202 DATABASE MANAGEMENT SYSTEM

Time: 1.5 Hours Maximum Marks : 30

Note: Attempt all questions. Assume suitable missing data, if any.

Q1 (a) Explain the concept of DBMS. Discuss its overall structure with diagram.

(b) What are different types of database interfaces. Classify them with example. **(2X3=6)**

Q2 Consider the following set of requirements for a Company database that is used to keep track of employee's department and their project transcripts:

Company is organized into various Department with a unique name and a particular employee who manages the department. Department may have several locations. Start date for the manager is recorded. A department controls a number of Projects with a unique name, number and a single location. Company's Employee name, id, address, salary, sex and birth date are recorded. An employee is assigned to one department, but may work for several projects (not necessarily controlled by his/her dept). Number of hours/week an employee works on each project is recorded; The immediate supervisor for the employee. Employee's Dependent are tracked for health insurance purposes (dependent name, birthdate, relationship to employee).

Draw an ER Diagram for the above problem statement. **(6)**

Q3 (i) Consider the following relational schema:

Author (AuthorId, FirstName, LastName)

AuthorPub (AuthorId, PubId, AuthorPosition)

Book (BookId, BookTitle, Month, Year, Editor)

Pub (PubId, Title, BookId)

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AuthorId in AuthorPub is a foreign key referencing Author. PubId in AuthorPub is a foreign key referencing Pub. BookId in Pub is a foreign key referencing Book. Editor in Book is a foreign key referencing Author (AuthorId).

(a) Determine the names of all authors who are book editors.

(b) Obtain the names of all authors who are not book editors.

(c) Get the names of all authors who have at least one publication in the database.

Write the above queries in Relational Algebra. (3X1=3)

(ii) Consider the following relational schema:

Student (rollNo, name, degree, year, sex, deptNo, advisor)

Department (deptId, name, hod, phone)

Course (courseId, cname, credits, deptNo)

Enrollment (rollNo, courseId, sem, year, grade)

a. Determine the departments that do not have any girl students.

b. Obtain the names of courses enrolled by student named Thomas.

c. Get the names of students who have scored 'O' in all subjects they have enrolled. Assume that every student is enrolled in at least one course.

Write the above queries in Tuple Relational Calculus. (3X1=3)

Q4 Explain Inference Rules in functional dependency. For a relation R{A,B,C,D,E,F,G} the given set of functional dependencies are as follows $A \rightarrow B$, $BC \rightarrow DE$, $AEF \rightarrow G$. Prove that $ACF \rightarrow DG$. (6)

Q5 (a) Explain the concept of database schema with diagram.

(b) Given are the two sets of FDs for the relation F and G:

$F = \{ B \rightarrow CD, AD \rightarrow E, B \rightarrow A\}$ and

$G = \{ B \rightarrow CDE, B \rightarrow ABC, AD \rightarrow E\}$.

Compute whether they are equivalent sets of FDs or not. (2X3=6)

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