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Fifth Semester B.E. Degree Examination, June/July 2015
Database Management Systems

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

1.
 - a. Discuss the main characteristics of the database approach. (08 Marks)
 - b. Explain the three-schema architecture. What is the difference between logical data independence and physical data independence? (08 Marks)
 - c. Define the database and briefly explain the implicit properties of the database. (04 Marks)

2.
 - a. Define the following terms with an example:
 - i) Composite attribute
 - ii) Complex attribute
 - iii) Participation constraints
 - iv) Cardinality ratio
 - v) Ternary relationship. (10 Marks)
 - b. Design an ER diagram for an insurance company. Assume suitable entity types like CUSTOMER, AGENT, BRANCH, POLICY, PAYEMENT and the relationship between them. (10 Marks)

3.
 - a. Briefly discuss how the different update operations on a relation deal with constraint violations? (08 Marks)
 - b. Consider the following schema for a COMPANY database:
 EMPLOYEE (Fname, Lname, Ssn, Address, Super-ssn, Salary, Dno)
 DEPARTMENT (Dname, Dnumber, Mgr-ssn, Mgr-start-date)
 DEPT-LOCATIONS (Dnumber, Dlocation)
 PROJECT (Pname, Pnumber, Plocation, Dnum)
 WORKS-ON (Essn, Pno, Hours)
 DEPENDENT (Essn, Dependent-name, Sex, Bdate, Relationship)
 Write the queries in relational algebra.
 - i) Retrieve the name and address of all employees who work for 'Sales' department.
 - ii) Find the names of employees who work on all the projects controlled by the department number 3.
 - iii) List the names of all employees with two or more dependents.
 - iv) Retrieve the names of employees who have no dependents. (12 Marks)

4.
 - a. Consider the database schema of Fig.Q.3(b), write the SQL query for the following:
 - i) List the names of managers who have at least one dependent.
 - ii) Retrieve the list of employees and the projects they are working on, ordered by department and, within each department, ordered alphabetically by last name, first name.
 - iii) For each project, retrieve the project number, the project name, and the number of employees who work on that project.
 - iv) For each project on which more than two employees work, retrieve the project number, the project name, and the number of employees who work on the project.
 - v) For each project, retrieve the project number, the project name, and the number of employees from department 4 who work on the project. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50 will be treated as malpractice.



- b. List and explain the basic data types available for attributes in SQL and give example. (05 Marks)
- c. Explain how the GROUP BY clause works. What is the difference between the WHERE and HAVING clause? (05 Marks)

PART – B

- 5 a. Explain insert, delete and update statements in SQL and give example for each. (08 Marks)
- b. Write a note on:
- i) Views in SQL
 - ii) Aggregate functions in SQL
 - iii) Database stored procedures and functions. (12 Marks)
- 6 a. Explain the informal design guidelines for relation schemes. (08 Marks)
- b. Define and explain the first, second and third normal forms. (12 Marks)
- 7 a. Define multivalued dependency. Explain 4NF with an example. (10 Marks)
- b. Let $R = \{Ssn, Ename, Pnumber, Pname, Plocation, Hours\}$ and $D = \{R_1, R_2, R_3\}$ where
 $R_1 = EMP = \{Ssn, Ename\}$
 $R_2 = PROJ = \{Pnumber, Pname, Plocation\}$
 $R_3 = WORKS-ON = \{Ssn, Pnumber, Hours\}$
The following functional dependencies hold on relation R.
 $F = \{Ssn \rightarrow Ename; Pnumber \rightarrow \{Pname, Plocation\};$
 $\{Ssn, Pnumber\} \rightarrow Hours\}$
Prove that the above decomposition of relation R has the lossless join property. (10 Marks)
- 8 a. Draw a state diagram and discuss the typical states that a transaction goes through during execution. (10 Marks)
- b. Explain the problems that can occur when concurrent transactions are executed. Give example. (10 Marks)

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