Code No: 134AP **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, April/May - 2023
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What is a relation? Differentiate between a relation schema and a relation instance. [2]
b) What is the difference between a candidate key and the primary key for a given relation? What is a super key? [3]
c) What is Trigger? Why it is used? [2]
d) Describe the projection operator. What can you say about the cardinality of the input and output tables for this operator? [3]
e) What are the problems related to decompositions? [2]
f) Define 'Functional Dependencies'. How are primary keys related to FDs? [3]
g) What functionality does the recovery manager of a DBMS provide? [2]
h) Define the terms transaction, schedule, complete schedule, and serial schedule. [3]
i) What is the search key for an index? [2]
j) What is an index? What is the relationship between files and indexes? Can we have several indexes on a single file of records? [3]

PART – B

(50 Marks)

2.a) Explain i) The data definition language ii) The data manipulation language iii) The buffer manager iv) The data model.
b) What are integrity constraints? Define the terms primary key constraint and foreign key constraint. How are these constraints expressed in SQL? What other kinds of constraints can we express in SQL? [5+5]

OR

3.a) What guidelines would you use for each of these choices when doing ER design: Whether to use an attribute or an entity set, an entity or a relationship set, a binary or ternary relationship, or aggregation.
b) A company database needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dn, with dname and budget as attributes), and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. We are not interested in information about a child once the parent leaves the company. Draw an ER diagram that captures this information. [5+5]

4.a) Describe the set operations of relational algebra, including union(U), intersection(n), set-difference(-), and cross-product(x). For each, what can you say about the cardinality of their input and output tables?

b) What are nested queries? What is correlation in nested queries? How would you use the operators IN, EXISTS, UNIQUE, ANY, and ALL in writing nested queries? Why are they useful? [4+6]

OR

5.a) What aggregate operators does SQL support?

b) Consider the following relational schema. An employee can work in more than one department; the pct_time field of the Works relation shows the percentage of time that a given employee works in a given department.
Emp(eid: integer, ename: string, age: integer, salary: real)
Works(eid: integer, did: integer, pct_time: integer)
Dept(did: integer, budget: real, managerid: integer)
Write SQL integrity constraints (domain, key, foreign key, or CHECK constraints; or assertions) or SQL triggers to ensure each of the following requirements, considered independently.
i) Employees must make a minimum salary of $1000.
ii) Every manager must be also be an employee.
iii) A manager must always have a higher salary than any employee that he or she manages.
iv) Whenever an employee is given a raise, the department's budget must be increased to be greater than the sum of salaries of all employees in the department. [4+6]

6.a) What are normal forms? What is their purpose?

b) Define 1NF and 2NF. What is the motivation for putting a relation in BCNF? What is the motivation for 3NF? [3+7]

OR

7. Define multi-valued dependencies, explain 4NF. [10]

8.a) Explain how the use of Strict 2PL would prevent interference between the two transactions.

b) What is the phantom problem? What impact does it have on performance? [4+6]

OR

9. Discuss about remote backup systems. [10]

10. Discuss in detail about ISAM. [10]

OR

11. Explain extendible hashing with example. [10]

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