

Tribhuvan University
Institute of Science and Technology
2069
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Bachelor Level/ Second Year/ Fourth Semester/ Science
Computer Science and Information Technology (CSc. 253)
(Database Management System)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Attempt all the questions.

1. Answer the following questions in short: (5 x 2 =10)

- a) Differentiate between two-tier and three-tier client/server architecture.
- b) The null value attribute and its uses.
- c) Difference between logical data independence and physical data independence.
- d) When is the concept of a weak entity used in data modeling?
- e) The difference among a relationship instance, a relationship type, and relationship set.

2. a) Draw an ER diagram for database showing hospital system. The Hospital maintains data about affiliated Hospitals, type of treatments facilities given at each hospital and patients. (6)

b) In what sense does a relational calculus differ from relational algebra, and in what sense are they similar? (4)

3. a) Assume a database about Company. (5)

EMPLOYEE (ss#, name)
COMPANY (cname, address)
WORKS (ss#, cname)
SUPERVISE (supervisor_ss#, employee_ss#)

Write relational algebra and SQL queries for each of the following cases.

- i) Find the names of all supervisors that work in companies whose address equals 'Biratnagar'.
- ii) Find the name of all the companies who have more than 10 employees.
- iii) Find the name of supervisor who has the minimum number of employees.

b) What is constraint? How does SQL allow implementation of general integrity constraints? (1+4)

4. a) Define a first, second, and third normal forms with suitable examples. (5)

b) What is a functional dependency? Describe full and partial dependency with suitable example. (1+4)

5. a) Draw a state diagram, and discuss the typical state that a transaction goes through during transaction. (5)

5. b) Describe the serial and serializable schedule? Why serializable schedule is consider correct? (5)

6.a) How does the granularity of data items affects the performance of concurrency control? What factors affect selections of granularity size for data items? (5)

b) Describe write ahead logging protocol. (5)