

Tribhuvan University

Institute of Science and Technology

2069

Bachelor Level/ First Year/ First Semester/ Science
Computer Science and Information Technology
Database Management System (CSc. 253)

Full Marks: 60
Pass Marks: 24

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

1. Answer the following questions in short: (5X2=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 a relationship set.

2.
 - a) Draw an ER diagram for a database showing Hospital system. The Hospital maintains data about Affiliated Hospitals, type of Treatments facilities given at each hospital, and Patients.
 - b) In what sense does relational calculus differ from relational algebra, and in what sense are they similar?.

3.
 - a) Assume a database about Company, - EMPLOYEE(ss#, name) COMPANY (cname, address) WORKS (ssh.cname) - SUPERWISES(supervisor ss#, employee ssh)
Write relational algebra and SQL queries for each of the following cases.
 - (i) Find the names of all the supervisors that work in companies whose address equals 'Biratnagar',
 - (ii) Find the names of all the companies who have more than 10 employees.
 - (iii) Find the name of the supervisor who has the minimum number of employees.

 - b) What is constraint? How does SQL allow implementation of general integrity constraints?

4.
 - a) Define a first, second, and third normal forms with suitable examples.
 - b) What is a functional dependency? When are two sets of functional dependencies equivalent? How can we determine their equivalence?

- 5.

- a) Draw a state diagram, and discuss the typical state that a transaction goes through during transaction.
- b) Describe the serial and serializable schedule? Why serializable schedule is consider correct?

6.

- a) How the granularity of data items does affects the performance of concurrency control? What factors affect selections of granularity size for data items??
- b) Describe write-ahead logging protocol.