

# Tribhuvan University Institute of Science and Technology

2067

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. Advantages of DBMS approach over file system approach.
  - b. Difference between two tier and three tier client – server architecture.
  - c. What is weak entity, owner entity type and identifying relationship?
  - d. The null value attribute and its uses.
  - e. Recursive relationship type with suitable example.
  
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 Patientstype of Treatments facilities given at each hospital, and Patients.
  - b) In what What is join operation? Differentiate between equijoin and natural join with suitable example.
  
3.

Assume database about Company

EMPLOYEE (ss#, name)

COMPANY (cname, address)

WORKS (ss#, cname)

SUPERVISES (supervisor\_ss#, employee\_ss#)

  - a) Write relational algebra and SQL queries for each of the following cases.
    - i) Find the names of supervisors that work in companies whose address equals ' Kathhmandu'
    - ii) Find the names of all the companies who have more than 4 supervisors.
    - iii) Find the name of the supervisor who has the largest number of employees.
  - b) How can define view in SQL? Explain the problems that may arise when one attempts to update a view.

- 4.
- a) What are different update anomalies? Explain each in with suitable examples.
  - b) Define functional dependency. Describe the closure of a set of functional dependencies with an example.
- 5.
- a) Draw a state diagram, and discuss the typical state th it a transaction goes through during transaction.
  - b) Which of the following schedule is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules.
    - i)  $r_1(x); r_3(x); w_1(x); r_2(x); w_3(x);$
    - ii)  $r_1(x); r_3(x); w_3(x); w_1(x); r_2(x);$
    - iii)  $r_3(x); r_2(x); w_3(x); r_1(x); w_1(x);$
    - iv)  $r_3(x); r_2(x); r_1(x); w_3(x); w_1(x)$
- 6.
- a) Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems.
  - b) Describe write-ahead logging protocol.