

Tribhuvan University
Institute of Science and Technology
2067
☆

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. (5x2=10)
 - a. Advantage of DBMS approach over file system approach.
 - b. Differentiate 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 Patients. (6)
- b) What is join operation? Differentiate between equijoin and natural join with suitable example. (4)
- 3.a) Assume a database about **Company**.
EMPLOYEE (ss#, name)
COMPANY (cname, address)
WORKS (ss#, cname)
SUPERVISES (supervisor_ss#, employee_ss#)

Write relational algebra and SQL queries for each of the following cases. (5)
 - (i) Find the names of all the supervisors that work in companies whose address equal 'Kathmandu'.
 - (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. (1+4)
- 4.a) What are different update anomalies? Explain each in with suitable example. (1+4)
- b) Define functional dependency. Describe the closure of a set of functional dependencies with an example. (1+4)
- 5.a) Draw a state diagram, and discuss the typical state that a transaction goes through during transaction. (5)
- b) Which of the following schedule is (conflict) Serializable? For each serializable schedule, determine the equivalent serial schedules. (5)
 - i) r1(x); r3(x); w1(x); r2(x); w3(x);
 - ii) r1(x); r3(x); w3(x); w1(x); r2(x);
 - iii) r3(x); r2(x); w3(x); r1(x); w1(x);
 - iv) r3(x); r2(x); r1(x); w3(x); w1(x);
- 6.a) Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems. (5)
- b) Describe write-ahead logging protocol. (5)