

Tribhuvan University
Institute of Science and Technology
2074

Bachelor Level / fourth-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC260)** Pass marks: 24 (Database Management System) Time: 3 hours Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all the questions.

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

- (a) Data abstraction
- (b) Network data model
- (c) Trigger
- (d) Trivial functional dependency
- (e) Serializable schedule

2.(a) Who is a data administrator? What are the main function of database administrator?(2 + 3 = 5)

- (b) Construct an E-R diagram for online course registration where students register courses online.(5)

3. Consider the following database, where primary keys are underlined

teaches(TID, TName, Qualification)

teaches(TID, CID)

course(CID, CName, CCode)

Construct the following relational algebra and SQL queries for this database.(10)

- (a) Find the names of all teachers who have PhD qualification.
- (b) Find the names of all courses taught by Ram Prasad.
- (c) Find the total number of courses taught by Ram Prasad.

4.(a) Discuss referential integrity with example.(5)

4(b) What is functional dependency? Why do we need inference rules?(2.5 + 2.5 = 5)

5. What are the benefits of using normalization? Discuss 1NF, 2NF, and 3NF with suitable example.(2.5 + 7.5 = 10)

6.(a) Why do we need concurrency control? Discuss two phase locking protocol.(2 + 3 = 5)

- (b) Why do we need database recovery? Discuss shadow paging technique for database recovery.(2 + 3 = 5)