

Tribhuvan University  
Institute of Science and Technology  
2080



Bachelor Level / Second Year/ Forth Semester/ Science  
**Computer Science and Information Technology (CSC.253)**  
(Database Management System)  
**(OLD COURSE)**

Full Marks: 60  
Pass Marks: 24  
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.**

**(6×10=60)**

1. Consider a university database with three tables and primary keys underlined as given below:

Teacher (TID, TName, Address, Email, Mobile)

Teaches(TID, CID)

Course(CID, CName, Code)

Write both relational algebra and SQL queries:

- a. To display name of all teachers in the database. (2)
  - b. To find name of all courses taught by the teacher "Ram". (4)
  - c. To count number of courses taught by the teacher "Ram". (4)
- 2.
- a. Why database is important to store data? Explain. (5)
  - b. What is entity relationship model? Explain one-to-one, one-to-many, and many-to-many relationship. (2 + 3)
- 3.
- a. Define data independence. Explain physical and logical data independence. (1 + 4)
  - b. Define data integrity. What is referential integrity? (1 + 4)
- 4.
- a. Define functional dependency? Why do we need functional dependency? (2 + 3)
  - b. Why do we need to perform normalization? Explain 1NF and 3NF with example. (1 + 4)
- 5.
- a. Why do we need concurrency control in databases? What is lost update problem? (2 + 3)
  - b. Define deadlock. Explain deadlock detection and recovery technique. What is starvation? (1+3+1)
- 6.
- a. What are desirable properties of transaction? Define serializable schedule? (4 + 1)
  - b. What is log based recovery? What is checkpoint? (3 + 2)