Tribhuvan University
Institute of Science and Technology
2068
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Bachelor Level/ Second Year/ Fourth Semester/ Science   Full Marks: 60
Computer Science and Information Technology (CSc. 253)   Pass Marks: 24
(Database Management System)   Time: 3 hours.

Candidates are required to give their answers in their own words as for 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) Differentiate between program-data independence and program-operation independence.
    (b) The ANSI/SPARC architecture with diagram.
    (c) Differentiate between procedural and nonprocedural DMLs.
    (d) The difference among an entity, an entity type, and an entity set.
    (e) When is the concept of a weak entity is used in data modeling?

2. (a) Draw an ER diagram for a database to keep track of the teams and games of a sport league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the position they played in that game, and the result of the game.   (6)

  (b) What is union compatibility? Define operations union, intersection, and difference on two union compatible relations R and S with suitable example.   (4)

3. (a) Describe the different clauses in the syntax of an SQL query, and show what type of constructs can be specified in each clause.   (5)

  (b) What is constraint? How does SQL allow implementation of general integrity constraints?   (1+4)

4. (a) Define Boyce-Codd normal form. How does it differ from 3 NF? Why is it considered a stronger form of 3NF?   (1+4)

  (b) What is functional dependency? Describe full and partial functional dependency with suitable example.   (1+4)

5. (a) Discuss the ACID properties of a database transaction with suitable example.   (5)

  (b) What is schedule? Define the concept of recoverable, cascadeless, and strict schedule, and compare them in terms of their recoverability.   (1+4)

6. (a) What is the two-phase locking protocol? How does it guarantee serializability?   (5)

  (b) What do you mean by transaction rollback? What is meant by cascading rollback? Why do practical recovery methods use protocols that do not permit cascading rollback?   (5)