Tribhuvan University
Institute of Science and Technology
2080
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Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSC 260)
(Database Management System)
(NEW COURSE)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
All figures in the margin indicate full marks.

Section A

Long Answer Questions.
Attempt any TWO questions.   (2×10=20)

1. Consider a banking database with three tables and primary keys underlined as given below:
    Customer (<u>CustomerID</u>, CustomerName, Address, Phone, Email)
    Owns(<u>CustomerID</u>, <u>AccountNumber</u>)
    Account(<u>AccountNumber</u>, AccountType, Balance)
    Write both relational algebra and SQL queries:
    a. To display name of all customers who live in "Kathmandu".   (2)

    b. To count total number of customers.   (2)

    c. To find name of those customers who have balance greater than or equal to 100000.
                                                                       (3)
    d. To find average balance of each account type.   (3)

2. Define normalization. Why normalization is important in database design? Explain 1NF, 2NF, and 3NF with suitable example.   (1+3+6)

3. What is two-phase locking? What are different types of locks in two-phase locking? Explain basic, conservative, strict, and rigorous two-phase locking. What is lock conversion?
                                                                       (2+2+4+2)

Section B

Shoer Answer Questions.
Attempt any EIGHT questions.   (8×5=40)

4. What is flat-file system? What are advantages of using DBMS approach?   (1 + 4)

5. Define data abstraction, data model, schemas, instances, and database state. (5)

6. What is conceptual data model? Explain different types of attributes used in ER diagram.

(1.5 + 3.5)

7. What is relational model? Define the terms domain, attribute, tuple, and relation. (1 + 4)

8. What is tuple relational calculus? Explain. (5)

9. Define transaction. What are different desirable properties of transaction? (1 + 4)

10. Why do we need concurrency control in databases? Explain. (5)

11. Why database recovery is essential? Explain recovery technique based on immediate update.

(2 + 3)

12. Write short notes on: (2 × 2.5 = 5)
    a. Natural join
    b. Shadow paging