2023

ADVANCED DBMS

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. a) Prove the followings: 5+5=10

   i. $\{X\text{-}>YZ\} \models X\text{-}>Y$.
   ii. $\{X\text{-}>Y, X\text{-}>Z\} \models X\text{-}>YZ$.

   b) Given a relation R (A, B, C, D) and a set of functional dependency 10
       F = { C –> D, D –> A, AB –> C}.
       Relation R is decomposed into R1(A, B, C) and R2(C, D). Check whether
       the decomposition is dependency preserving or not.

2. Consider the following relation schema: 2.5x8 =20
    salesman (salesman_id, name, city, commission)
    customer (customer_id, customer_name, city, grade, salesman_id)
    order (order_no, purch_amt, order_date, customer_id, salesman_id)

   Write SQL queries for the following:
   i.   Find the name and city of those customers and salesmen who lives
         in the same city.
   ii.   Find the names of all customers along with the salesmen who works
         for them.
   iii. Display all those orders by the customers not located in the same
         cities where their salesmen live.
   iv.   Display all the orders issued by the salesman 'Paul Adam' from the
         orders table.
   v.   Display all the orders which values are greater than the average
         order value for 10th October 2023.
   vi.   Extract the data from the orders table for the salesman who earned
         the maximum commission.
   vii. Find the name and ids of all salesmen who had more than one
         customer.
   viii. Write a query to find all the salesmen who worked for only one
         customer.

3. a) Discuss the atomicity, durability, isolation and consistency preservation properties of a database transaction. 6

   b) Explain 3NF and BCNF with suitable examples. 14

4. a) Explain any two problems that may occur because of concurrent execution of transactions. 10

   b) Explain the different phases of Optimistic Concurrency Control. 10

   OR

   The given functional dependencies are as follows –
   A -> BC, B -> C, A -> B, AB -> C
   Find the minimal cover.

5. What is Multiversion Concurrency Control? What are its types? Discuss its benefits and drawbacks. 20

*****