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Paper Code : EC-705C

DATABASE MANAGEMENT SYSTEM

Time Allotted : 3 Hours   Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

$$10 \times 1 = 10$$

i) Overall logical structure of a database can be expressed graphically by

   a) ER diagram   b) Records

   c) Relations   d) Hierarchy.

ii) Which of the following levels of abstraction involves the view of data ?

   a) External level

   b) Conceptual level

   c) Physical level

   d) None of these.

     [Turn over

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iii) The ability to modify the internal schema without causing any change to external schema is

   a) physical data independence

   b) logical data independence

   c) external data independence

   d) none of these.

iv) A table can have only one

   a) Primary key

   b) Candidate key

   c) Super key

   d) All of these.

v) 2NF is always in

   a) 1NF

   b) BCNF

   c) MVD

   d) None of these.

vi) The concurrency control has the problem of

   a) Lost updates

   b) Dirty read

   c) Unrepeatable read

   d) All of these.

vii) Advantage of locking algorithms in concurrent execution of database transaction is

   a) Deadlock

   b) Concurrency

   c) Consistency

   d) None of these.

viii) The information about data in a database is called

   a) Hyper data

   b) Tera data

   c) Meta data

   d) None of these.

ix) SELECT operation in SQL is a

   a) Data definition language

   b) Data query language

   c) DML

   d) DCL.

x) Which operator performs pattern matching in SQL ?

   a) Except

   b) Intersect

   c) Like

   d) All of these.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following. $3 \times 5 = 15$

2. a) Define DBA.

    b) Explain the functionalities of DBA. $2 + 3$

3. Explain why 4NF is more desirable tan BCNF.

4. Explain two-phase locking protocol with suitable example.

5. a) List the types of privileges used in database access control.

    b) What is 'Weak Entity' ? $4 + 1$

6. List and explain the inference rules of functional dependencies.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain the concept of specialization and generalization in ER modeling through appropriate example.

    b) Explain the ACID properties of a transaction in Database Management System.

    c) Why commit and rollback statement are important in SQL ? $5 + 6 + 4$

8. a) Explain 1NF, 2NF, 3NF and BCNF with examples.

b) Consider a relation schema R (A, B, C, D, E, G)

with set F of functional dependencies

$\{ A \rightarrow B, BC \rightarrow D, D \rightarrow E, D \rightarrow G \}$.

Find the closure of F.

c) Consider the following relations :

Person (name, street, city)

Owns (name, reg_no, model, year)

Accident (data, reg_no)

Answer the following using tuple relational calculus :

i) Find the names of persons who are not involved in any accident

ii) Find the names and street of persons who own a Maruti car

iii) Find the registration numbers of the cars manufactured in the year 2014.   6 + 6 + 3

9. a) Why do we lock a database ? Define two-phase locking protocol.

b) What is an Index ? What are all the different types of indexes ?

c) What is the difference between DELETE, TRUNCATE and DROP commands ?

d) Explain various update anomalies that can arise in a relational database with examples.   5 + 4 + 2 + 4

10. a) Consider the following relation schema :

EMP (EMP_NAME, STREET, CITY)

WORKS (EMP_NAME, COMPANY_NAME, CITY, SALARY)

COMPANY (COMPANY_NAME, CITY)

MANAGER (EMP_NAME, MANAGER_NAME)

i) Write a query to display the names of the employees with E as the 2nd character in name.

ii) Find all employees in the same city as the companies for which they work

iii) Find all employees who earn more than every employee of 'SBI' Bank

iv) Find all companies located in every city in which 'SBI' is located

v) Write a query to give bonus (3% of gross) to those employee who currently drawing gross <= 10000.

b) What is deadlock ? Discuss **"Wait-die"** & **"Wound-wait"** technique of deadlock prevention ?

5 x 2 + 5

11. Write short notes on any *three* of the following :   3 × 5

   a)   Armstrong's Axioms

   b)   Lossless decomposition

   c)   Data models

   d)   B+ Tree

   e)   Data Security and Integrity.