Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS / M.TECH (IT) / SE / SEM-1/ MSE-102 / 2010-11

2010-11

DATABASE MANAGEMENT SYSTEM CONCEPT

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.

Answer any *five* of the following.   5 × 14 = 70

1.   a)   Define 'meta data'. What is the difference between 'Strong Entity Set' and 'Weak Entity Set' ?

b)   Explain 'Generalization' and 'Specialization'.

c)   Draw an E-R diagram to capture the requirements as stated below :

A toy manufacturing company manufacturers different types of toys. The company has several manufacturing plants. Each plant manufacturers different types of toys. A customer can place the order for these toys. Each order may contain one or more toys. Each customer has multiple ship-to addresses. To promote the business, the company offers different schemes based on the order value.   5 + 5 + 4

40412   [Turn over]

2. a) Define DBMS.

   b) What are the two types of data independence?

   c) What are the types of database language ?

   d) What is procedural language ? Explain with an example.

   e) Differentiate between schema and snapshot.

   f) Explain three levels of data abstraction in DBMS.

$$2 + 3 + 2 + 2 + 2 + 3$$

3. a) Consider the following set F of functional dependencies on a schema (A, B, C)

   $A \rightarrow BC$

   $B \rightarrow C$

   $A \rightarrow B$

   $AB \rightarrow C$

   Compute canonical cover for F.

   b) Consider the rational database as given below and write down expressions in relational algebra or SQL for the following queries.

   customer (customer_name, customer_street, customer_city)

   depositor (customer_name, account_no)

   loan (loan_no, branch_name, amount)

   borrower (customer_name, loan_no)

   account (account_no, branch_name, balance)

   branch (branch_name, branch_city, assets)

   i) Find the name of all bank customers who have either an account or a loan or both.

ii) Find the names of all customers who have a loan at the Kolkata branch.

iii) Find the largest account balance in the bank.

iv) Find the name of all branches with customers who have an account in the bank and who live in Kolkata.

v) Find all customers who have an account at all the branches located in Kolkata. 4 + 10

4. a) What is a trigger ? Write a trigger for following case :

Instead of a allowing negative account balances, the bank deals with overdrafts by setting the account balance to zero and creating a loan in the amount of the overdraft. The bank gives this loan a loan number identical to the account number of the overdrawn account.

b) Define view. Why is it required ? (2 + 7) + (2 + 3)

5. a) If F be the set of all functional dependencies, compute F^+ (closure of F).

b) Explain Armstrong's axioms.

c) Define extraneous attributes. Discuss with example.

5 + 5 + 4

6. a) Convert the following table to BCNF :
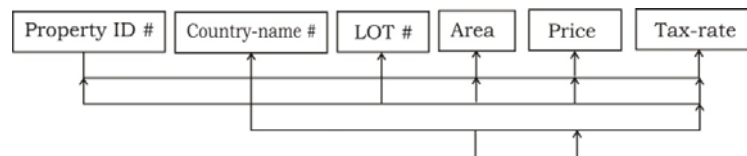
b) Define BCNF. How does it differ from 3NF ? Why is it considered stronger from 3NF ?

c) Explain 'partial functional dependency' and 'transitive dependency' with example.   5 + 5 + 4

7. a) Consider the relation R (A, B, C, D) with the set of $F = \{A \rightarrow B, A \rightarrow C, C \rightarrow D\}$. Suppose the relation has been decomposed by the relations $R1$ (A, B, C) and $R2$ (C,D). Is this decomposition lossy or lossess ? Justify your answer.

b) Why is concurrency control needed ?

c) What are the two phases of two-phase locking protocol ?

d) Describe conflict serializability and view serializability.

4 + 3 + 3 + 4

8. Write short notes on the following (any two).   2 × 7

   i)   Multivalued Dependency (MVD)

   ii) Cannonical cover

   iii) Insertion, Updation and Deletion anomalies.

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