Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.TECH (ECE)/SEM-7/EC-704C/2012-13

2012

DATABASE MANAGEMENT SYSTEM

Time Allotted : 3 Hours   *Full Marks* : 70
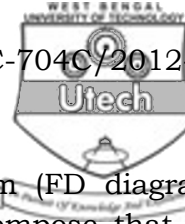
The figures in the margin indicate full marks.

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 × 1 = 10

    i)   In the relational modes, cardinality is termed as
       a)   number of tuples   b)   number of attributes
       c)   number of tables   d)   number of constraints.

    ii) Relational calculus is
       a)   procedural language
       b)   non-procedural language
       c)   data definition language
       d)   high level language.

    iii) Cartesian product in relational algebra is
       a)   a unary operator   b)   a binary operator
       c)   a ternary operator   d)   not defined.

    iv) DML is provided for
       a)   description of logical structure of database
       b)   addition of new structures in the database system
       c)   manipulation & processing of database
       d)   definition of physical structure of database system.

v) In a relational model, relations are termed as

   a) tuples   b) attributes

   c) tables   d) rows.

vi) In case of entity integrity, the primary key may be

   a) not Null   b) Null

   c) both Null & not Null   d) any value.

vii) In an E-R diagram an entity set is represented by a

   a) rectangle   b) ellipse

   c) diamond box   d) circle.

viii) Which of the following operations is used if we are interested in only certain columns of a table ?

   a) PROJECTION   b) SELECTION

   c) UNION   d) JOIN.

ix) Which of the following is a comparison operator in SQL ?

   a) =   b) LIKE

   c) BETWEEN   d) All of these.

x) Using Relational Algebra the query that finds customers, who have a balance of over 1000 is

   a) Π Customer_name (σ balance > 1000 (Deposit))

   b) σ Customer_name (Π balance > 1000 (Deposit))

   c) Π Customer_name (σ balance > 1000 (Borrow))

   d) σ Customer_name (Π balance > 1000 (Borrow)).

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. a) What is referential integrity ?

   b) Explain with example the difference between strong and weak entity sets.   2 + 3

3. a) What is the difference between a database & a table ?

   b) What is metadata ?   2 + 3

4. a) What is lossless decomposition ?

   b) Draw a functional dependency diagram (FD diagram) that is in 3NF but not in BCNF. Decompose that FD diagram into BCNF.   2 + 3

5. Describe the ACID properties of a transaction.

6. What is the difference between immediate updation and deffered updation of database ? Write down the utility of check point mechanism in log based recovery.   2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.   3 × 15 = 45

7. Consider the following tables :

   Match(Matchid, Team1, Team2, ground, date, winner)

   Player(Playerid, Lname, Fname, Country, YBorn, Bplace, Ftest)

   Batting(Matchid, Pid, Over, Nruns, Nballs, Four, Sixes)

   Bowling(Matchid, Pid, NOvers, Maidens, NRuns, NWickets)

   Write down the SQL statements for the following :   5 × 3

   a) List the name of players who belongs to 'Australia'.

   b) Find the player ids of player who have batted either in match 2755 or in match 2654.

   c) Find the information of players who has born after 1980.

   d) Display a sorted list of ground names where England has played as team1.

   e) Find the number of players those have bowled in ODI match 2613.

8. a) Given below are two sets of FDs for a relation $R (A, B, C, D, E)$. Are they equivalent ?

   i) $F = \{ A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D > E \}$

   ii) $E = \{ A \rightarrow BC, D \rightarrow AE \}$
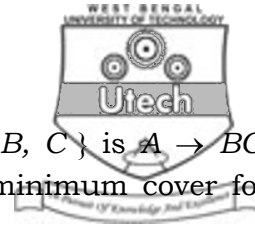
    b)   A set of FDs for the relation $R \{ A, B, C \}$ is $A \rightarrow BC$, $B \rightarrow C$, $A \rightarrow B$, $AB \rightarrow C$. Find the minimum cover for those set of FDs.

    c)   Define functional dependency. Define derived key.

<div align="right">4 + 6 + (3 + 2)</div>

9.   a)   Explain the different anomalies.

    b)   Distinguish between conflict and view serializability.

    c)   State the difference between the following in brief :

        Primary Index *vs* Secondary Index.

    d)   Define BCNF. How does it differ from 3NF ?

<div align="right">4 + 4 + 3 + 4</div>

10. Consider the following relation for published books :

    Book(Book_title, Author_Name, Book_Type, listprice, author_affil, Publisher)

    Author_affil refers to the affiliation of author. Suppose the following FDs exist :

    Book_title → Publisher, Book_type

    Book_Type → Listprice

    Author_Name → Author_affil

    a)   What normal form is in the relation ? Explain your answer.

    b)   Normalize until you cannot decompose the relation further.

    c)   Indicate the PK & FK.   3 + 9 + 3

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

    a)   Query optimization

    b)   Trigger

    c)   Data Independence

    d)   Cascading rollback

    e)   Spurious tuples.

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