



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.TECH(ECE)/SEP.SUPPLE/SEM-7/EC-704C/2012**

**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 any *ten* of the following :

10 × 1 = 10

- i) Data structure of the data stored in a database is dealt by
  - a) external schema
  - b) conceptual schema
  - c) internal schema
  - d) varies with different databases.
- ii) An attribute of one table matching the primary key of another table is called a
  - a) candidate key
  - b) secondary key
  - c) foreign key
  - d) composite key.
- iii) Four DML commands are
  - a) CREATE, UPDATE, DELETE, SELECT
  - b) INSERT, UPDATE, DROP, SELECT
  - c) CREATE, ALTER, DELETE, SELECT
  - d) INSERT, MODIFY, DELETE, SELECT
  - e) INSERT, UPDATE, DELETE, SELECT.

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[ Turn over

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- iv) Which of the following is not a DDL statement ?

a) UPDATE                      b) DROP  
c) CREATE                     d) ALTER.

v) Which is not a set operator ?

a) UNION                        b) INTERSECT  
c) MINUS                       d) LIKE.

vi) What is a relationship called when an association is maintained within a single entity ?

a) Unary                        b) Binary  
c) Ternary                      d) Quarternary.

vii) Cardinality ratio means

a) number of attributes associated with an entity  
b) number of entity related with other entity via a relationship  
c) both (a) and (b)  
d) none of these.

viii) DCL implies the commands

a) select and update          b) insert and delete  
c) grant and revoke          d) create and drop.

ix) One of the shortcomings of the system is

a) data availability          b) fixed records  
c) sequential records        d) lack of security.

x) Blocking factor is

a) blocks fetched per sector  
b) blocks fit into sectors  
c) tuples fit per block  
d) blocks for storing a relation.

xi) A discriminator is also called

a) partial key                  b) super key  
c) foreign key                 d) primary key.

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**GROUP – B****( Short Answer Type Questions )**Answer any *three* of the following.

$3 \times 5 = 15$

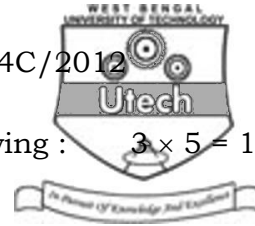
2. Discuss the ACID properties of a transaction.
3. State the advantage of using database system versus file-based information system.
4. What do you mean by integrity constraint ? "Primary key is one type of integrity constant." Explain.  $2\frac{1}{2} + 2\frac{1}{2}$
5. a) What do you mean by cardinality of a relationship ? Explain.
- b) Give example of a composite attribute.  $4 + 1$
6. What is the difference between Cartesian product, Natural join and outer join (left, right, full) ? Illustrate using suitable example.

**GROUP – C****( Long Answer Type Questions )**Answer any *three* of the following.

$3 \times 15 = 45$

7. a) Construct an *E-R* diagram for a car-insurance company whose customers own one or more car each. Each car is associated with it zero to any number of recorded accident.
- b) Explain the distinctions among the terms 'primary key', 'candidate key' and 'super key'.
- c) Explain the difference between physical and logical data independence.  $6 + 6 + 3$
8. a) Describe the differences in meaning between the terms 'relation' and 'relation schema'. Illustrate your answer by an example.
- b) We know how to represent many-to-many, many-to-one, one-to-many and one-to-one relationship sets. Explain how primary keys help us to represent such relationship sets in the relational model.
- c) List two major problems with processing update operations expressed in terms of views.  $5 + 5 + 5$

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9. Write short notes on any *three* of the following :  $3 \times 5 = 15$
- Data Independence
  - B-tree Organisation
  - Query optimization
  - Multivalued dependency and 4NF
  - Trigger mechanism.
10. a) Define phantom deadlock.  
 b) Describe different deadlock detection techniques.  
 c) What is hashing ?  
 d) What are the advantages of embedded SQL program ?  
 e) What are different types of join operation ?  $5 \times 3$
11. a) Let the following relation schemas given :  
 $R = (A, B, C)$   
 $S = (D, E, F)$   
 Let relations  $r(R)$  and  $s(S)$  be given. Give an express in the tuple relational calculus that is equivalent to each of the following :
- $\prod_A(r)$
  - $\sigma_{B=17}(r)$
  - $r \times s$
  - $\prod_{A,F}(\sigma_{C=D}(r \times s))$
- b) Let  $R = (A, B)$  and  $S = (A, C)$  and let  $r(R)$  and  $s(S)$  be relations. Write relational algebra expression equivalent to the following domain relational calculus expressions :
- $\{ \langle a \rangle \mid \exists b (\langle a, b \rangle \in r \wedge b = 17) \}$
  - $\{ \langle a, b, c \rangle \mid \langle a, b \rangle \in r \wedge \langle a, c \rangle \in s \}$
  - $\{ \langle a \rangle \mid \exists b (\langle a, b \rangle \in r) \vee \forall c (\exists d (\langle d, c \rangle \in s) \Rightarrow \langle a, c \rangle \in s) \}$
  - $\{ \langle a \rangle \mid \exists c (\langle a, c \rangle \in s \wedge \exists b_1, b_2 (\langle a, b_1 \rangle \in r \wedge \langle c, b_2 \rangle \in r \wedge b_1 > b_2) ) \}$
- $7 + 8$
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