



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

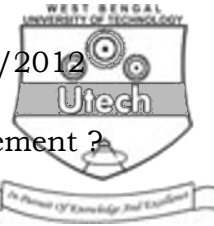
The figures in the margin indicate full marks.

*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.



- 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.



GROUP – B

(Short Answer Type Questions)

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

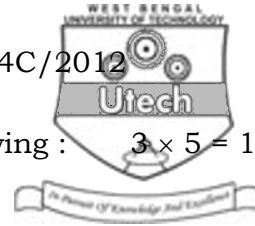
2. Discuss the ACID properties of a transaction.
3. State the advantage of using database system versus file-based information system.
4. What do you mean by integrity constraint ? "Primary key is one type of integrity constant." Explain. $2\frac{1}{2} + 2\frac{1}{2}$
5. a) What do you mean by cardinality 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. $5 + 5 + 5$



9. Write short notes on any *three* of the following : $3 \times 5 = 15$
- a) Data Independence
 - b) B-tree Organisation
 - c) Query optimization
 - d) Multivalued dependency and 4NF
 - e) 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 ? 5×3
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 :

- i) $\prod_A(r)$
 - ii) $\sigma_{B = 17}(r)$
 - iii) $r \times s$
 - iv) $\prod_{A,F}(\sigma_{C = D}(r \times s))$
- 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 :
- i) $\{ \langle a \rangle \mid \exists b (\langle a, b \rangle \in r \wedge b = 17) \}$
 - ii) $\{ \langle a, b, c \rangle \mid \langle a, b \rangle \in r \wedge \langle a, c \rangle \in s \}$
 - iii) $\{ \langle a \rangle \mid \exists b (\langle a, b \rangle \in r) \vee \forall c (\exists d (\langle d, c \rangle \in s) \Rightarrow \langle a, c \rangle \in s) \}$
 - iv) $\{ \langle a \rangle \mid \exists c (\langle a, c \rangle \in s \wedge \exists b_1, b_2 (\langle a, b_1 \rangle \in r \wedge \langle c, b_2 \rangle \in r \wedge b_1 > b_2)) \}$

$7 + 8$

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