



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH(IT)/SEM-6/IT-604/2012

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) A table can have only one
 - a) Primary key
 - b) Candidate key
 - c) Super key
 - d) all of these.
- ii) What is the smallest unit of data in a relational model ?
 - a) Data type
 - b) Field
 - c) Data value
 - d) None of these.
- iii) 2 NF is always in
 - a) INF
 - b) BCNF
 - c) MUD
 - d) None of these.



- iv) Select operation in SQL is a
- a) data query language
 - b) data definition language
 - c) DML
 - d) DCL.
- v) In ER model symbol is used for
- a) attribute
 - b) entity
 - c) relation
 - d) none of these.
- vi) BCNF is a type of
- a) Indexing
 - b) DFD
 - c) Normalization
 - d) none of these.
- vii) What is the cardinality of a table with 1000 rows and 10 columns ?
- a) 10
 - b) 100
 - c) 1000
 - d) None of these.
- viii) Which operator performs pattern matching in SQL ?
- a) Except
 - b) Intersect
 - c) Like
 - d) All of these.
- ix) An index on the search key is called a
- a) primary index
 - b) secondary index
 - c) multilevel index
 - d) all of these.



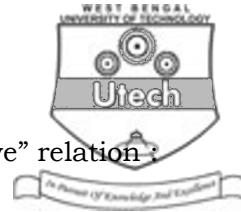
- x) Which phase is not part of a two phase locking protocol ?
- a) Growing phase b) Shrinking phase
- c) Stabilization phase d) None of these.
- xi) The data dictionary tells the DBMS,
- a) What files are in the database
- b) What attributes are possessed by data
- c) What these files contain
- d) All of these.
- xii) Fore DMC commands are
- a) Create, update, delete, select
- b) Insert, update, drop, select
- c) Create, alter, delete, select
- d) Insert , modify, delete, select.
- xiii) Which is not an ACID property ?
- a) Atomicity b) Integrity
- c) Consistency d) Durability.

GROUP – B

(Short Answer Type Questions)

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

2. Explain DDL, DML & DCL.



3. Consider the following “Sailor” and “Reserve” relation :

Reserve (sid, bid, day)

Sailor (sid, sname, rating, age)

Formulate relational algebra Query :

- a) Find names of sailors who have reserved boat # XXX.
 - b) Find names and ages of sailors who have reserved a boat.
4. Explain “two phase” locking protocol.
5. Define BCNF. How does it differ from 3NF ? Why is it considered stronger than 3 NF ?
6. Discuss the “entity integrity” and “referential integrity” constraint. Why is it considered important ? Explain with suitable example.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Find out the closure of attribute set (AG) i.e. (AG)⁺ in the R.

Set of FD's F are as given below :

$R = \{ A, B, C, G, H, I \}$

$F = \{ A \rightarrow B, A \rightarrow C, CG \rightarrow H, CG \rightarrow I, B \rightarrow H \}$ is (AG) is a super key of R ?



- b) What are the differences between Embedded SQL and Dynamic SQL ?
- c) Define super key, candidate key and primary key.
- d) Compare between 3NF and BCNF with example.

5 + 2 + 3 + 5

8. a) Consider the following relation and write question in SQL :
- w) Flights (flow, from, to, distance, departs, arrives, price)
 - x) Aircraft (Aid, aname, cruising – range).
 - y) Certified (eid, aid).
 - z) Employees (eid, ename, salary)
 - i) Identify the flights that can be piloted by every pilot whose salary is more than \$ 1,00,000.
 - ii) Find the eids of employees who make the second highest salary.
 - iii) Find the names of pilots who can operate planes with a range greater than 3000 mintes but are not certified on any Boeing aircraft.
 - iv) Print the names and salary of every non-pilot whose salary is more than average salary for pilots.
- b) Specify the query in SQL to declare a “Cursor” to find names & cities of residence of customers who have both an account and a loan at a particular bank branch in the same city as that customer.



- c) The sales man-master table records the salesman-no, name, rate-of-commission, qtd-sales. The commission-amount and date-of-payment along with the salesman-no is calculated and recorded in commission-payable table.

Write a PL/SQL block of code such that depending upon the user entered salesman-no, the Commission-amount is calculated and inserted into the commission-payable table.

4 + 5 + 6

9. a) What are dense and sparse indexing ? Explain with an example.

- b) Create a B⁺ tree with the plowing key :
order-3, key = 8, 5, 1, 7, 3, 12, 9, 6.

- c) What is a view ?

6 + 7 + 2

10. a) What is multiple inheritance ?

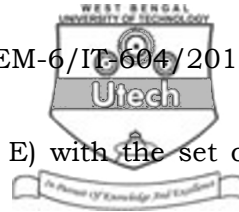
- b) What is attribute inheritance ?

- c) Draw ER diagram showing cardinality :

A bill is sent to a customer. A customer may receive many bills. A clerk works in a bank. A bank has many clerks. Students appear for seats in a college. Each student can get almost one seat. A college has many seats. A student can sent many applications.

- d) With an example describe specialization and generalisation.

2 + 2 + 4 + 2 + 2 + 3



11. a) Consider the relation R (A, B, C, D, E) with the set of FD's.

$$F = \{A \rightarrow C, B \rightarrow C, C \rightarrow D, DC \rightarrow C, CE \rightarrow A\}.$$

Suppose the relation has been decomposed by relations

$R_1 (A, D), R_2 (A, B), R_3 (B, E), R_4 (C, D, E), R_5 (A, E).$

Is this decomposition lossy or lossless ? Justify your answer. 3

- b) Use the definition of FD to argue that each of "Armstrong Axiom" namely reflexivity, augmentation, pseudo transitivity, union & decomposition are sound. 5

- c) What is a trigger ? How many types of trigger are there ?

3 + 4

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