



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 )**

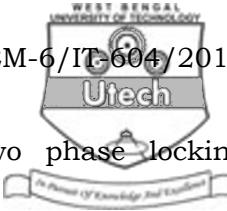
1. Choose the correct alternatives for any ten of the following :

$10 \times 1 = 10$

- 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.

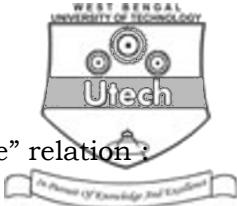


- x) Which phase is not part of a two phase locking protocol ?
- a) Growing phase      b) Shrinking phase  
c) Stabilization phase      d) None of these.
- xi) The data dictionary tells the DBMS,
- a) What files are in the database  
b) What attributes are possessed by data  
c) What these files contain  
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.
- $2\frac{1}{2} + 2\frac{1}{2}$

- 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 miles 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<sup>+</sup> 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 send many applications.

- d) With an example describe specialization and generalisation.

2 + 2 + 4 + 2 + 2 + 3



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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<sub>1</sub> (A, D), R<sub>2</sub> (A, B), R<sub>3</sub> (B, E), R<sub>4</sub> (C, D, E), R<sub>5</sub> (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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