

5E3254

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B.Tech. V Sem.(Main/Back) Exam Dec. 2012

Computer Science

5C54 Data Base Management System

Common for CS & IT

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any **five question** selecting **one question from each unit**. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. \_\_\_\_\_ Nil \_\_\_\_\_

2. \_\_\_\_\_ Nil \_\_\_\_\_

### UNIT-I

- Q.1 a) Define data model. Explain similarities and differences among network, hierarchical and relational data model. [10]
- b) Define key. Explain the distinctions among term primary key, candidate key and super key. [6]

OR

- Q.1 a) What is RDBMS? Describe integrity constraints in relational data model. [4+6=10]
- b) Write short notes on (Any three):
- (i) Participation constraints.
  - (ii) Role in ER-data model.
  - (iii) Aggregation.
  - (iv) Identifying Relationship. [2+2+2=6]

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[Contd...]

## UNIT-II

- Q.2 What is view in DBMS? List two reasons why we may choose to define a view and list two major problems with processing update operations expressed in terms of views. [4+6+6=16]

OR

- Q.2 a) Consider the following database schema  
employee (ename, street, city)  
Works (ename, company\_name, salary)  
Company (company\_name, city)  
manager (ename, mgr\_name)

Give regular expression for each of the following statements:

- i) Find the company with most employees.
- ii) Find the company with the smallest payroll.
- iii) Give all employees of ABC company a 10-percent salary raise.
- iv) Delete all tuples in the works relation for employee of XYZ company.
- v) Find the names and cities of residence of all employees who work for ABC company

[2+2+2+2+2=10]

- b) Explain any 3 set-operators and 3-Aggregate operators in SQL with the help of suitable examples. [3+3=6]

## UNIT-III

- Q.3 a) Define Functional Dependency. Explain Armstrong's axioms or rules, with examples. [2+6=8]

- b) Compute  $F^+$  of the following set F of Functional Dependency for relation schema  $R = (A, B, C, D, E)$ .

$A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A$  [4]

- c) List the candidate key for R (given in Q. 3.b.) [4]

OR

- Q.3 a) Decompose the schema  $R = (A, B, C, D, E)$  into  $(A, B, C)$  and  $(A, D, E)$ . Show that this decomposition is a lossless-join decomposition if the following set  $F$  of functional dependencies holds:

$A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A$  [6]

- b) Define transaction & transaction states. Give state diagram for transaction. [2+6+2=10]

### UNIT-IV

- Q.4 a) What is 'lock' in DBMS? What is difference between lock-based, time-stamp based and validation-based protocols for concurrency control. [2+6=8]

- b) What is 'dead-lock' and 'live-lock' in DBMS? Give two dead lock prevention schemes. [4+4=8]

**OR**

- Q.4 a) Explain the following two log-based recovery schemes

(i) Deferred Database modifications

(ii) Immediate Database modifications [4+4=8]

- b) Make distinction between "Shadow Copy" and "Shadow-Paging" techniques. [4+4=8]

### UNIT-V

- Q.5 a) Explain the following three single level indexing.

(i) Primary Index

(ii) Clustering Index

(iii) Secondary Index [8]

- b) Describe the similarities and differences between B - tree and  $B^+$  - tree. [8]

**OR**

Construct a B - tree for the following set of key values -

( 80, 50, 10, 70, 30, 100, 90 )

Assume that the tree is initially empty and the values are added in the order given.  
The number of pointers per node is 3 (i.e. order is 3).

Show the tree after each of the following series of operations.

(i) Insert 75

(ii) Insert 95

(iii) Delete 30

(iv) Delete 10

[16]