CS/B.TECH (CSE) (SUPPLE)/SEM-7/CS-704A/09
DISTRIBUTED DATABASE (SEMESTER - 7)

1. .....
Signature of Invigilator

2. .....
Signature of the Officer-in-Charge

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.TECH (CSE) (SUPPLE)/SEM-7/CS-704A/09
ENGINEERING & MANAGEMENT EXAMINATIONS, JULY – 2009
DISTRIBUTED DATABASE (SEMESTER - 7)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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Marks Obtained

	Group – A										Group – B			Group – C			***Total Marks***	***Examiner's Signature***
Question Number																		
Marks Obtained																		

.....
Head-Examiner/Co-Ordinator/Scrutineer

S-53049 (31/07)

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GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Which of the following is a component of a distributed database system ?

a) Server b) Client

c) Network d) All of these. ☐

ii) Which of the following is increased with redundant data in distributed database system ?

a) Reliability b) Availability

c) Inconsistency d) All of these. ☐

iii) A ..... is the set of all tuples for which a minterm predicate holds.

a) multiset b) table

c) fragment d) none of these. ☐

iv) We can use ..... to ensure that no intruder can understand the messages which are exchanged between the sites of a distributed database system.

a) encryption b) decryption

c) digital signature d) none of these. ☐

v) Data about data is called

a) data catalog b) metadata

c) information d) all of these.

vi) Which of the following operations is used to reconstruct the global relation from its horizontal fragments ?

a) Join

b) Cartesian product

c) Union

d) Intersection.

vii) The protocols which use a weighted majority are called

a) quorum-based protocols

b) primary site protocols

c) time-based protocols

d) none of these.

viii) Cold restart is required if

a) we want to make backup of the database

b) the log information is lost at a site

c) we want to reconstruct the most recent state of a failed site

d) none of these.

ix) Database profiles contain information about

a) cardinality of each fragment

b) sum of sizes (in bytes) of the attributes of each fragment

c) the number of distinct values for each attributes in each fragment

d) all of these.

x) Which of the following is the probability that the system is operational according to its specification at a given point in time ?

a) Reliability b) Maintainability

c) Availability d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What do you mean by distributed database ? What are the advantages of distributed DBMS over centralized DBMS ? 1 + 4

3. What is the difference between homogeneous and heterogeneous distributed DBMS ? State and explain the three basic rules for defining fragmentation. 2 + 3

4. What do you mean by join graph ? What are the different types of join graph ? Why we need join graph in distributed database systems ? 1 + 2 + 2

5. Consider the following global schema :

EMP (EMPNUM , NAME, SAL, TAX, MGRNUM, DEPTNUM) DEPT (DEPTNUM, NAME, AREA, MGRNUM)

Draw the operator tree for the following global query :

$PJ_{NAME, TAX}$ ((EMP $JN_{DEPTNUM = DEPTNUM}$ $SL_{AREA = \text{“NORTH”}}$ DEPT)

DF (EMP $JN_{DEPTNUM = DEPTNUM}$ $SL_{DEPTNUM < 10}$ DEPT))

where, SL, PJ, JN and DF stands for selection, projection, join and difference operations respectively.

Now determine common sub-expressions in the query. Do step-by-step transformations indicating which rule is applied at each step, to simplify the global query. 1 + 4

6. Discuss data security and privacy with respect to distributed database 5

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Discuss the scope for developing a distributed database system for each of the following aspects : 4 × 2

   i) Interconnection of existing databases

   ii) Incremental growth of organization

   iii) Communication overhead

   iv) Reliability and availability.

   b) Present a reference architecture for distributed database systems. 5

   c) What is physical image of a global relation ? Give example. 2

8. a) Briefly describe architectural models for distributed DBMSs with respect to

i) the autonomy of local systems

ii) their distribution, and

iii) their heterogeneity. 4 + 3 + 2

b) Define horizontal and vertical fragmentations with suitable examples. 3

c) What is derived horizontal fraagmentation ? Why is it so significant in distributed database systems ? 3

9. a) Why distributed deadlocks occur ? 2

b) What are distributed wait-for-graph and local wait-for-graph ? How wait-for-graph helps in deadlock detection ? 3 + 3

c) Consider the following wait-for-graph :

dia

Where T_i s are the transactions and → waiting for the case of different transactions — — — → waiting in the case of same transactions.

Detect the deadlock occurred here. 4

d) What is false deadlock ? What are the different approaches to the problem of false deadlocks ? 3

10. a) What is meant by catalogs of distributed databases ? What are the uses of these catalogs in DDBMS ? 5

b) What are the contents of catalog ? 5

c) How are the catalogs allocated in DDBMS ? 5

11. Write short notes on any *three* the following : 3 × 5

a) Distribution transparency in distributed database

b) Network Partitioning

c) Distributed 2-phase locking protocol

d) Primary copy locking

e) ODBC connectivity.

END