Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (CSE)/SEM-2/MCSE-202/2013

2013

ADVANCED DATABASE MANAGEMENT SYSTEMS

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.

Answer Question No. 1 and any *four* from the rest.

GROUP – A

Answer any *seven* of the following. $7 \times 2 = 14$

1. a) What is the difference between dense index and the sparse index ?

   b) What do you mean by granularity of locking ?

   c) What is distributed database systems ?

   d) What is the additional threat to handle deadlock from centralized to DDBMS ?

   e) Consider the two transactions T_1 and T_2 such that

   $T_1 = R_1(A)\, W_1(A)\, R_1(B)\, W_1(B)$

   $T_2 = R_2(A)\, W_2(A)\, R_2(C)\, W_2(C)$

   Let schedule S :

   $R_1(A)\, W_1(A)\, R_2(A)\, W_2(A)\, R_1(B)\, W_1(B)\, R_2(C)\, W_2(C)$

   Find out the given schedule S is conflict serializable or not.

f) What is non-recoverable schedule ? What is cascade less schedule ?

g) What is data warehouse ?

h) What are the weaknesses of RDBMSs ?

i) What is meant by overloading and overriding ?

j) What do you mean by temporal database ?

GROUP – B

Answer any *four* of the following. 4 × 14 = 56

2. a) Consider the following global schema, fragmentation schema, allocation schema

Global schema : Guest (G_ID, block_ID, room_no, name)

Fragmentation schema

G1 :: σ block_id = "north" (Guest) G2 :: σ block_id = "south" (Guest)

Allocation Schema *G*1 at site 2 and *G*2 at site 1

Write a query that accepts *G*_ID from user and output the name at level 1, 2 and 3 of transparency. 5

b) With suitable examples, show how recovery in database system can be done using log files with immediate update and deffered update technique. 6

c) What is the difference between KDD and data mining ? 3

3. a) What are the rules which must be followed when defining fragmentation ? 3

b) Describe the wait-die and wound-wait protocols for deadlock prevention. 3

c) Explain horizontal fragmentation, derived horizontal fragmentation and mixed fragmentation with suitable example. 5

d) What is the difference between DTD and XML schema ? 3

4. a) Explain with diagram the reference architecture of distributed DBMS. 4

b) Explain multi-dimensional data model with example. 5

c) Explain distributed deadlock detection and recovery technique. 5

5. a) Give an example to prove that distributed 2PL is more restrictive than compared to distributed serializability. 3

b) What is XML ? 1

c) Write an XML document with an external DTD having employee as root element and having Name, Address, Sex, Emp_id, Ph_no and Designation as child elements where each child elements has atleast one attribute attached to it. Ph_no. element may have one or more entry. 5

d) What is warehouse schema ? How many types are they ? Explain each of them with suitable example. 5

6. a) Consider the following SQL querry :

SELECT *FROM Branch *b*, Property *p* WHERE b.bno = p.bno AND p.type = "flat";

Assume that relation property and branch are horizontally fragmented as follows :

$P1 : \sigma_{bno}$ = "B001"^tpe="house"(Property) $B1 : \sigma_{bno}$ = "B001"(Branch)

$P2 : \sigma_{bno}$ = "B001"^tpe="flat"(Property) $B2 : \sigma_{bno!}$ = "B001"(Branch)

$P3 : \sigma_{bno!}$ = "B001"(Property)

Draw the generic tree for the above query.

Draw the reduced tree using reduction technique. 5

b) What is Data Mart ? How many types are they ? Explain each of them. 5

c) Give full details of 2PC protocol in distributed environment. Outline the algorithms for both coordinator and participants. 4

7. a) Write short notes on any *two* of the following : 2 × 3

i) Heuristic Query optimization

ii) Timestamp protocol

iii) ACID.

b) Explain different communication structure with diagram for 2PC protocol. 3

c) What are possible failures in DDBMS ? How does 2PC recover from each of those failures ? 1 + 4