

MCA (Revised)
Term-End Examination
December, 2012

**MCS-043 : ADVANCED DATABASE
MANAGEMENT SYSTEMS**

Time : 3 hours

Maximum Marks : 100

Note : *Question number 1 is compulsory. Answer any three questions from the rest.*

1. (a) Given the following semi structured data in XML , create the DTD (Document Type Declaration) for it: 3
- ```
<DOCUMENT>
<STUDENT>
 <NAME> RAJESH </NAME>
 <CLASS> X-A </CLASS>
 <SCHOOL> K.V; R.K.PURAM,
DELHI</SCHOOL>
</STUDENT>
<STUDENT>
 <NAME> SANJAY</NAME>
 <CLASS> XI-C </CLASS>
 <SCHOOL> GURUKUL, GHAZIBAD
</SCHOOL>
</STUDENT>
</DOCUMENT>
```

- (b) How BCNF is different from 3NF. Explain with the help of an example. Consider a relation  $R(A,B,C)$  with functional dependencies  $AB \rightarrow C$  and  $C \rightarrow A$ . Decompose the relation 'R' into BCNF relations. 7
- (c) What are views and what is their significance? How views are managed in SQL, explain using an example? 5
- (d) What is data mart? How is it different from data warehouse? How the management of data in a database, is different from the management of data in a data warehouse. Explain using example. 7
- (e) Consider the following three transactions 5
- |                  |                   |                    |
|------------------|-------------------|--------------------|
| $T_1$            | $T_2$             | $T_3$              |
| Read (x)         | Read (x)          | Read (x)           |
| $x = x - 1000$   | <u>display(x)</u> | $Y := (x)$         |
| <u>Write (x)</u> |                   | <u>display (x)</u> |
- Insert shared and exclusive locks in  $T_1$ ,  $T_2$  and  $T_3$  such that the transactions when executed concurrently, do not encounter any concurrency related problem.
- (f) What is Datagrid? Show typical structure of datagrid. What are the application areas of datagrid? 5
- (g) What are Web-databases? How do you create them? 4
- (h) Explain shadow paging recovery scheme with the help of diagram. 4

2. (a) Illustrate using an example the Apriori algorithm for association rule mining. 6
- (b) Discuss, how Oracle manages database security ? 5
- (c) Consider the following SQL Query on the employee relation: 9
- ```
SELECT  LNAME, FNAME
FROM    EMPLOYEE
WHERE   SALARY > (SELECT MAX
(SALARY) FROM EMPLOYEE WHERE
DNO = 5)
```
- Derive an execution plan for the Query. Give a measure of Query Cost. Make suitable assumptions.
3. (a) What are mobile databases ? Discuss the characteristics of mobile databases. Give an application of mobile database. 6
- (b) Explain how the 3 phase commit protocol increases the systems availability and doesn't allow transaction to remain blocked until a failure is repaired, with a suitable example. 8
- (c) What is meant by the term "ETL" ? Discuss the transformations required during the ETL process. 6

4. (a) What is “tuning a database” ? What are the goals of tuning in relational database system ? Why is Query tuning required ? 6
- (b) Explain the following two ways to implement the object oriented concepts in DBMS : 8
- (i) To extend the existing RDBMS to include object orientation
- (ii) To create a new DBMS that is exclusively devoted to Object Oriented DBMS
- (c) Explain data fragmentation in DDBMS with the help of an examples. 6
5. (a) Explain the following in context of ORACLE/PostGRESQL 6
- (i) Triggers
- (ii) Security
- (iii) Data dictionary
- (b) Explain the following : 8
- (i) Embedded SQL
- (ii) Deductive Databases
- (iii) OLAP
- (iv) Join dependency
- (c) What is multiversion concurrency control ? Explain, how multiversion concurrency control can be achieved by using Time Stamp Ordering. 6