



Name :

Roll No. :

Invigilator's Signature :

**CS/M.TECH (CSE)/SEM-2/MCSE-201/2013
2013**

ADVANCED 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

Answer any *five* questions.

5 × 2 = 10

1. What is Transaction ?
2. Explain the Compatibility Matrix of Lock modes.
3. Define the three correctness rules of Fragmentation.
4. What are the Information requirements during allocation of fragments in case of distributed database ?
5. Define the following data mining functionalities for Predictive Analysis :
 - i) Classification
 - ii) Regression.
6. Define the z-score Normalization method for Data Transformation.

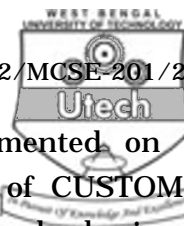


GROUP – B

Answer any *four* questions.

4 × 15 = 60

7. Consider the following global relations :
- PATIENT (PATIENTID, NAME, SSN, AMT_DUE, DEPT, DOCTOR, MED_TREAT)
- DEPARTMENT (DEPT, LOCATION, DIRECTOR)
- STAFF (STAFFNUM, DIRECTOR, TASK)
- Show each of the following fragmentations :
- a) DEPARTMENT has a horizontal fragmentation by LOCATION with two locations.
 - b) There are several staff members for each department, led by the department's director. STAFF has a horizontal fragmentation derived from that of the DEPARTMENT and a semi-join on the DIRECTOR attribute. Which assumption is required in order to assure completeness and disjointness and why ?
 - c) PATIENT has a mixed fragmentation : attributes PATIENTID, NAME, SSN and AMT_DUE constitute a vertical fragment used for accounting purposes ; attributes PATIENTID, NAME, DEPT, DOCTOR and MED_TREAT constitute a vertical fragment used for describing cares. This last fragment has a horizontal fragmentation derived from that of DEPARTMENT and a semi-join on the DEPT attribute. Which assumption is required in order to assure completeness and disjointness and why ?
- 4 + 5 + 6
8. In a bank, a distributed database is maintained having three global relations as follows :
- CUSTOMER (CUSTID, NAME, ADDRESS, ACCOUNTID),
- ACCOUNT (ACCOUNTID, BALANCE, BRANCHCODE),
- BRANCH (BRANCHCODE, CITY, ASSET).



- a) Relation BRANCH is horizontally fragmented on the basis of the CITY location. Fragments of CUSTOMER and ACCOUNT relations are derived horizontal fragments with respect to BRANCH relation. The bank has branches in two cities Kolkata and Delhi. Use relational algebra expressions to list all the fragments of these three global relations.
- b) Show the details of how the following SQL query will execute based on the fragments of the above problem :
- Update ACCOUNT set BALANCE = BALANCE + 1000 where ACCOUNTID = 'AC123'.
 - Select CUSTID, CUSTOMER.ACCOUNTID, BALANCE from CUSTOMER, ACCOUNT where CUSTOMER.ACCOUNTID = ACCOUNT.ACCOUNTID. 5 + 10
9. a) Given below is a table along with its attributes. Normalize the table up to 3 NF.
- SalesOrder { SalesOrderNo, Date, CustomerNo, CustomerName, CustomerAddress, ClerkNo, ClerkName, ItemNo, Description, Qty, Price }
- b) Determine common sub-expressions in the following Global queries based on Global relations :
- EMP (EMPNO, ENAME, SAL, TAX, MGRNO, DEPTNO),
DEPT (DEPTNO, DNAME, AREA, MGRNO).
- Do step by step transformations by showing the operator tree of each step along with the total number of tuples processed in each operator tree, in order to achieve an optimized query. 7 + 8



10. a) Discuss the 2-phase commitment protocol.
b) Explain one of the problems of 2-phase commitment protocol. 10 + 5
11. a) Explain Concurrency Control based on locking in distributed database management system using the notions of Primary Copy Locking protocol and Majority Locking protocol.
b) Explain Time Stamp based Concurrency Control Protocol with example. 5 + 10
12. a) Compare OLAP and OLTP.
b) Define and discuss Data Warehousing.
c) Explain any one of the schemas for multidimensional database with example. 6 + 4 + 5
13. a) Discuss the Data Cleaning and Data Reduction methods in Data Preprocessing.
b) Suppose that the data for analysis include an attribute 'Age'. Age values for the data tuples are :
13, 15, 16, 16, 19, 20, 21, 22, 23, 23, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 43, 46, 46, 52, 71.
i) Use Min-max Normalization to transform the value 36 for Age onto the range [1.0, 10.0]
ii) Use Smoothing by Bin Means to smooth the above data, using a bin depth of 3. Illustrate steps.

8 + 7

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