Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech(MMS)/SEM-2/MMS-203/2013

2013
TOPICS ON DBMS

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 any *five* from the following.

1. a)   Why tree structured indexes are good for searches, especially range selections ?

    b)   Why are the nodes at the leaf level linked ?

    c)   "Dynamic hashing maintains the memory requirement in an effective way " comment.

    d)   How does multilevel indexing improve the efficiency of searching ?   3 + 2 + 6 + 3

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2. a) Describe validation based concurrency control protocol. Why is it called optimistic concurrency control ?

   b) Discuss why the difference in cost between alternative plans for a query can be very large. Give specific example(s) to illustrate the choice of join methods and the availability of appropriate indexes. (5 + 2) + 7

3. a) Why do query optimizers consider only left deep join trees ? Give an example of a query and a plan that would not be considered because of this restriction.

   b) What do you mean by multiple granularity ? How it affects the performance of a concurrency control protocol ? Explain with an example.

   c) What do you mean by recoverable schedule ? 6 + 6 + 2

4. a) "Object relational model is better solution than relational model for any DBMS product." Justify the statement with proper example.

   b) State about the pitfalls of relational data model.

   c) What do you mean by structured data types ? Give example. 6 + 5 + 3
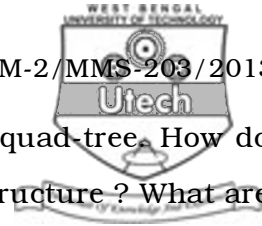
5. Explain the structure and operation of a quad-tree. How do you store an area feature in a quad-tree structure ? What are the limitations of quad tree while used for GIS applications ?

$$2 + 4 + 5 + 3$$

6. Explain why conventional database systems cannot handle spatial data efficiently ? Design a monolithic data organization to handle both spatial and non-spatial query related to GIS applications. $4 + 10$

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

   a) XML Databases

   b) Security issues in Statistical Database

   c) Fragmentation in Distributed Databases

   d) Temporal Database.

8. Comment critically on the following statements on any *four* of the following : $4 \times 3\frac{1}{2}$

   (you may argue in favour or against, no matter what is followed in practice. However, you need to defend it, of course strongly.]

   a) In case of distributed transaction, the 2-phase-commitment protocol may lead to sacrifice availability.

b) Undo and Redo operations used for recovery of databases must be idempotent.

c) An incomplete transaction cannot reveal its results to other transactions before its commitment.

d) Data redundancy is a non-desirable feature in centralized database and also should be avoided in distributed database system.

e) In case of update application in distributed database, data may need to be moved between fragments as well as tuple may be composed in different way.

f) A schedule is correct if it is serializable.

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