Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS / BCA / SEM-6 / BCAE-602C / 2011

2011

ADVANCED DATABASE MANAGEMENT

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
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) Autonomy refers to the distribution of
   - a) data
   - b) control
   - c) function
   - d) none of these.

   ii) The global query optimizer and decomposer are used to
   - a) check user query process
   - b) minimize execution strategy of cost function
   - c) interpret user command
   - d) distribute execution of the user request.

   iii) The local query optimizer acts
   - a) as access path selector
   - b) to manage local database remain constant
   - c) to interpret user command
   - d) none of these.

   iv) Distributed database is basically placement of
   - a) data and function
   - b) program and control
   - c) data and program
   - d) data and control.

v) Which of the following rules must be followed when defining fragments ?
   a) Completeness condition
   b) Reconstruction condition
   c) Disjointness condition
   d) All of these.

vi) Processing locality conflicts with
   a) availability and reliability of distributed data
   b) workload distribution
   c) storage and cost availability
   d) none of these.

vii) Local mapping schema depends on the
   a) global relations b) fragments
   c) types of local DBMS d) none of these.

viii) A multiprocessor system where two or more processors share the same primary memory is called
   a) homogeneous system b) loosely coupled system
   c) tightly coupled system d) none of these.

ix) Which of the following is the recovery management technique in case of distributed system ?
   a) Deferred update b) Immediate update
   c) Two-phase commit d) None of these.

x) The simplest way to reconstruct a global consistent state in a distributed database is to use
   a) local dumps b) local logs
   c) global check points d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain cascading rollback.
3. What is loss update problem and how can it be overcome ? 1 + 4
4. Discuss the relative advantages and disadvantages of a temporal database.
5. Explain the basic principle of Multiversion technique.
6. Discuss 4NF with suitable example.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain in brief, the ACID properties of a transaction. 4

   b) When are two operations said to be at conflict ? 3

   c) What is two-phase locking ? Discuss it. 5

   d) Define foreign key with example. 3

8. a) What is the difference between DDL and DML ? 4

   b) Define 5NF with an example. 4

   c) What do you mean by Data Dictionary ? What is its use ? 3 + 2

   d) What is primary key ? 2

9. What is transaction ? Describe the properties of a transaction. What is interleaving in transaction ? Explain the different anomalies in interleaving operation. 3 + 4 + 4 + 4

10. a) What are the methods to prevent unauthorized users in remote accessing in distributed database ?

    b) Explain the concurrency control mechanisms.

    c) Suppose that 2 PC with Presumed Abort is used as the commit protocol. Explain how the system recovers from failure and deals with a particular transaction *T* in each of the following cases :

       i) A subordinate site for *T* fails before receiving a *prepare* message.

       ii) A subordinate site for *T* fails after receiving a *prepare* message but before making a decision.

       iii) A subordinate site for *T* fails after receiving a *prepare* message and force-writing an abort log record but before responding to the *prepare* message.

iv) A subordinate site for *T* fails after receiving a *prepare* message and force-writing a prepare log record but before responding to the *prepare* message.

v) A subordinate site for *T* fails after receiving a *prepare* message, force-writing an abort log record, and sending a no vote.

vi) The coordinator site for *T* fails before sending a *prepare* message.

vii) The coordinator site for *T* fails after sending a *prepare* message but before collecting all votes.

viii) The coordinator site for *T* fails after writing an *abort* log record but before sending any further messages to its subordinates.

ix) The coordinator site for *T* fails after writing a *commit* log record but before sending any further messages to its subordinates.

x) The coordinator site for *T* fails after writing an *end* log record. Is it possible for the recovery process to receive an inquiry about the status of *T* from a subordinate ? 2 + 3 +10

11. What is the blocking problem in 2-phase commit protocol ? Explain how 3-phase commit overcomes this problem. Describe the distributed deadlock detection algorithm with an example. 3 + 6 + 6

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