MCAE-501A

DISTRIBUTED DATABASE MANAGEMENT SYSTEM

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
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. Answer all questions. $10 \times 1 = 10$

(i) A distributed database has which of the following advantages over a centralized database?

(A) software cost (B) software complexity
(C) slow response (D) modular growth

(ii) An autonomous homogenous environment is which of the following?

(A) the same DBMS is at each node and each DBMS works independently
(B) the same DBMS is at each node and a central DBMS coordinates database access
(C) a different DBMS is at each node and each DBMS works independently
(D) a different DBMS is at each node and a central DBMS coordinates database access

(iii) A transaction manager is which of the following?

(A) maintains a log of transactions
(B) maintains before and after database images
(C) maintains appropriate concurrency control
(D) all of these

(iv) Location transparency allows for which of the following?

(A) users to treat the data as if it is at one location

(B) programmers to treat the data as if it is at one location

(C) managers to treat the data as if it is at one location

(D) all of these

(v) A heterogeneous distributed database is which of the following?

(A) the same DBMS is used at each location and data are not distributed across all nodes

(B) the same DBMS is used at each location and data are distributed across all nodes

(C) a different DBMS is used at each location and data are not distributed across all nodes

(D) a different DBMS is used at each location and data are distributed across all nodes

(vi) Which of the following is true concerning a global transaction?

(A) the required data are at one local site and the distributed DBMS routes requests as necessary

(B) the required data are located in at least one nonlocal site and the distributed DBMS routes requests as necessary

(C) the required data are at one local site and the distributed DBMS passes the request to only the local DBMS

(D) the required data are located in at least one nonlocal site and the distributed DBMS passes the request to only the local DBMS

(vii) A homogenous distributed database is which of the following?

(A) the same DBMS is used at each location and data are not distributed across all nodes

(B) the same DBMS is used at each location and data are distributed across all nodes

(C) a different DBMS is used at each location and data are not distributed across all nodes

(D) a different DBMS is used at each location and data are distributed across all nodes

(viii) Replication should be used when which of the following exist?

(A) when transmission speeds and capacity in a network prohibit frequent refreshing of large tables

(B) when using many nodes with different operating systems and DBMSs and database designs

(C) the application's data can be somewhat out-of-date

(D) all of these

(ix) Storing a separate copy of the database at multiple locations is which of the following?

(A) data replication

(B) horizontal partitioning

(C) vertical partitioning

(D) horizontal and vertical partitioning

(x) A semi join is which of the following?

(A) only the joining attributes are sent from one site to another and then all of the rows are returned

(B) all of the attributes are sent from one site to another and then only the required rows are returned

(C) only the joining attributes are sent from one site to another and then only the required rows are returned

(D) all the attributes are sent from one site to another and then only the required rows are returned

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. $3 \times 5 = 15$

2. (a) What is allocation? What are the factors affecting allocation? 1+2
   (b) What is minterm predicate? 2

3. (a) What are the advantage and disadvantage of replication? 3
   (b) What is auxiliary program? 2

4. (a) What is vertical clustering? 3
   (b) What is partial union? 2

5. (a) What are the common difference between tightly and loosely coupled architecture? 3
   (b) What is deadlock prevention? 2

6. Explain the different levels of distributed transparency? 5

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Briefly discuss 2-phase commitment protocol. 5
   (b) What are the different communication structures for this protocol? 6
   (c) What is log-write-ahead protocol? 4

8. (a) Draw the reference architecture of distributed database? 6
   (b) What are the components which are necessary for building a distributed database? 5
   (c) What is allocation? What are the factors affecting allocation? 4

9. (a) What are horizontal, derived horizontal and vertical fragmentation? 8
   (b) Write the R* algorithm. 7

10. (a) What is query optimization? 3
    (b) Explain distributed cost model with an example. 5
    (c) What do you mean by the cardinality of selection? 2
    (d) Explain centralized query optimization? 5

11. Write short notes on any *three* of the following: 3×5
    (a) ODBC connectivity
    (b) MDBS
    (c) Peer-to-peer architecture
    (d) Check point and cold start
    (e) Wait-Die and Wound-Wait algorithm.