Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–II • EXAMINATION – WINTER 2013

Subject Code: 620006 **Date: 27-12-2013**

Subject Name: Database Management System - II

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4.

Q.1 **(a)** State whether the following statements are TRUE / FALSE with justification in case of FALSE. **07**

1. Level 0 transactions are recoverable.
2. Transaction's Durability is the responsibility of Operating System.
3. The REDO operation updates the database old values with new values that are stored in the log.
4. In the case of failure in Differed update system, UNDO and REDO both the operations are required for recovery.
5. Proxy server opens every packets entering and leaving the network.
6. Cardinality of a table means the number of columns in the table.
7. A query tree is also called a relational algebra tree.

(b) Define the following terms. **07**

1. Query Normalization
2. ODL (Object Definition Language)
3. Intra-query parallelism
4. Heterogeneous DDBS.
5. Outer Join
6. Shadow Paging
7. Dirty read problem

Q.2 **(a)** Differentiate the following.

(i) Deadlock Avoidance Vs. Deadlock Prevention **3**

(ii) Parallel Database Vs. Distributed Database **2**

(iii) Deferred Update Vs. Immediate Update **2**

(b) Answer the following

(i) What is transaction state transition diagram? Draw it and explain all the states of transaction. **04**

(ii) What is an audit trail? Describe required entries in audit trail file. **03**

OR

(b) Answer the following

(i) What is timestamp ordering? Explain various variants of it. **04**

(ii) Explain various threats to the database security. **03**

Q.3 **(a)** What is Relational Algebra? Explain the PROJECTION and CARTESIAN PRODUT operations with examples. **05**

(b) What is query decomposition? Write down stages of query decomposer and explain query normalization in detail. **05**

(c) What is the purpose of cost estimation in query optimization? Explain various cost components of query execution. **04**

OR

Q.3 **(a)** Write a note on relational calculus. **05**

(b) Explain the use of Query tree in query analysis. **05**

(c) Explain heuristic query optimization algorithm. **04**

Q.4 **(a)** Explain various concepts of OODB. **07**

(b) What is the use of lock in concurrency control? Explain various locking techniques. **07**

OR

Q.4 **(a)** Explain the key elements of parallel database processing. **07**

(b) Explain firewalls in detail. **07**

Q.5 **(a)** Consider the following transaction log entries for immediate update. **07**

Time	Transaction Step
T1	Rread (A,a1)
T2	a1:=a1 – 500
T3	Write (A,a1)
T4	Read (B,b1)
T5	b1 := b1 + 500
T6	Write (B,b1)

Suppose that a failure occurs

(i) Just after Write(B,b1)

(ii) Just after <B,COMMIT>

What actions are necessary and why? What are the resulting values of A and B, in both the cases.

(b) Consider the following database schema and write query in relational algebra. **07**

Supplier (S#, SName, Status, City)

Part (P#, PName, Color, Weigh, City)

Project (J#, JName, City)

SPJ (S#, P#, J#, Qty)

(i) Find all suppliers who locate in 'Rajkot'

(ii) Find all names of those suppliers who locate in 'Ahmedabad'

(iii) Find all parts that are red in color and weight more than 1 Kg.

(iv) Find all suppliers that have supplied Part-P2.

OR

Q.5 **(a)** Consider the following query. **07**

SELECT (P.PROPERTYNO,P.CITY)
FROM CLIENT AS C, VIEWING AS V, PROPERTY AS P
WHERE C.PROPERTY-TYPE = 'Flat' AND
C.CLIENT-NO = V.CLIENT-NO AND
V.PROPERY-NO = P.PROPERTY-NO AND
C.PERF-TYPE=P.TYPE AND
C.PREF-TYPE = P.TYPE AND
P.OWNER = 'Mahesh'.

Draw the query tree and Improve query tree

(i) By applying SELECT operations and

(ii) By changing Selection and Cartesian products to equijoins.

(b) Using poly-alphabetic substitution method, encrypt the given string using key and again decrypt the result to obtain the original back. **07**

String: "Database Management"

Key: "System"

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