

Name :

Roll No. :

Invigilator's Signature :

**CS/MCA/SEM-4/MCA-403/2011
2011**

DATABASE MANAGEMENT SYSTEM-II

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 × 1 = 10

- i) Transaction T1 reading the updates made by T2 (which have not yet committed) is
 - a) Dirty read
 - b) Non-replaceable read
 - c) Phantom phenomena
 - d) none of these.

- ii) Cautious waiting refers to
 - a) Deadlock Prevention b) Deadlock Detection
 - c) Deadlock Avoidance d) none of these.



- iii) An MVD $x \twoheadrightarrow y$ is trivial if and only if
- a) x is a superkey
 - b) x is a superset of y or xy constitute the entire table header
 - c) x is a primary key
 - d) none of these.
- iv) A schedule is serializable if
- a) produces same result as all possible serial schedule of participating transactions
 - b) produces same result as a serial schedule of participating transactions
 - c) produces same result as a concurrent schedule of participating transactions
 - d) it is same as a serial schedule of participating transactions.
- v) ALTER keyword refers to alteration of
- a) attributes value
 - b) schema
 - c) datadictionary
 - d) all of these.



- vi) Rollback of a transaction
- a) Updates the transaction
 - b) Repeats a transaction
 - c) Restores previous values
 - d) none of these.
- vii) Media recovery refers to recover
- a) after a system crash
 - b) after network failure
 - c) after database is physically damaged
 - d) after a transaction failure.
- viii) All instructions of a transaction execute consecutively in
- a) serial schedule
 - b) serializable schedule
 - c) recoverable schedule
 - d) cascadeless schedule.
- ix) A relation in BCNF always guarantees
- a) lossless join
 - b) dependency preservation
 - c) both (a) and (b)
 - d) none of these.



- x) Wait-for graph may be used to
- a) Detect deadlock
 - b) Prevent deadlock
 - c) Conflict serializability
 - d) View serializability.

GROUP – B

(Short Answer Type Questions)

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

2. a) Compare Database Triggers with database constraints.
b) Discuss the differences between procedures & Database Triggers. $2 \frac{1}{2} + 2 \frac{1}{2}$
3. Define Horizontal Fragmentation, Vertical Fragmentation, Derived Horizontal Fragmentation & Mixed Fragmentation.
4. a) Explain the term 'MVD' and the conditions for it to be trivial.
b) Decompose the relation { ENAME, PNAME, DNAME } into 4NF, given

ENAME \twoheadrightarrow PNAME

ENAME \twoheadrightarrow DNAME

And { ENAME, PNAME, DNAME } constitutes the primary key. $2 \frac{1}{2} + 2 \frac{1}{2}$



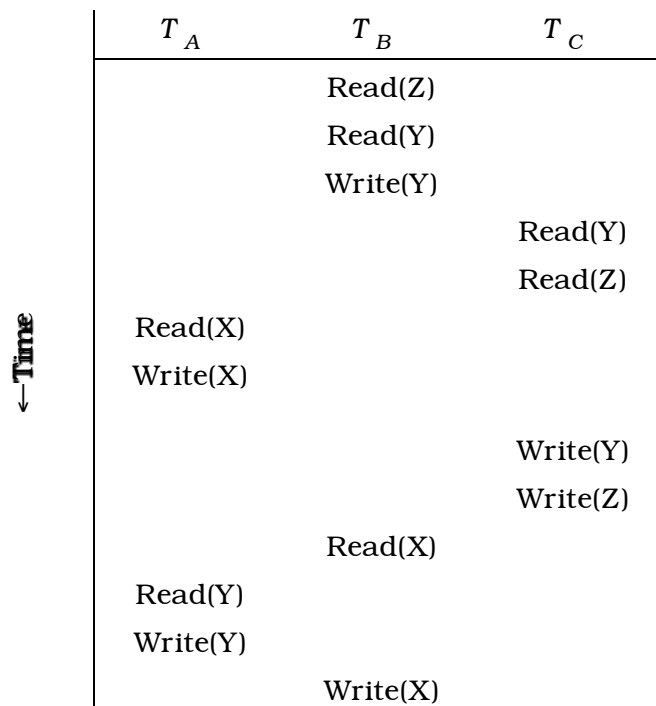
5. Explain the term 'Stable Storage'. State the various types of failures.
6. Differentiate between deadlock and starvation. Explain "Wait-Die" and "Wound-wait" with respect to deadlock prevention.

GROUP – C

(Long Answer Type Questions)

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

7. a) Explain two-phase locking with suitable example. 5
- b) Explain the utility of Precedence Graph. Draw the Precedence Graph for the following schedule S : 2 + 5 + 2



Explain the steps and justify whether S is serializable.

- c) Define 'Srializable Schedule'. 1



8. a) Explain 'S1 is the cover of S2' where S1 & S2 are 2 sets of FDs. State the conditions for S1 to be called equivalent to S2. 2 + 2

b) Given a relvar R with attributes A, B, C, D and set of FDs :

$$A \twoheadrightarrow BC, B \twoheadrightarrow C, A \twoheadrightarrow B, AB \twoheadrightarrow C, AC \twoheadrightarrow D$$

Find whether the given set of FDs are irreducible. Justify your answer and show the steps. 6

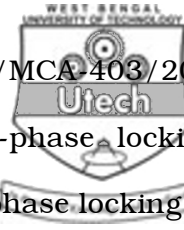
c) In which case the 2 projections R1 & R2 of relation R can be termed independent ? Explain 'Dependency Preservation' and the various considerations in implementation of the same. $2\frac{1}{2} + 2\frac{1}{2}$

9. a) Explain the various concurrency problems. Explain the term 'Log-Based-Recovery'. 4 + 4

b) Classify the various types of protocols to implement concurrency control. Compare with respect to advantages and disadvantages. 5 + 2

10. a) Justify whether schedules under tree protocol implies compliance with two-phase locking protocol & vice versa. Give examples. 3 + 5

b) Discuss the discriminating characteristic of Distributed Databases with respect to a set of the local databases. 7



11. a) Discuss the benefits of rigorous two-phase locking.
Compare it with the other forms of two-phase locking.

2 + 3

- b) Discuss the advantages of Timestamp Ordering protocol
over 2PL protocol.

4

- c) Describe the following terms :

3 × 2

- i) Intention Shared & Intention Exclusive Locks
- ii) Lock Granularity
- iii) Foreign Key.
