



Name :

Roll No. :

Invigilator's Signature :

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

2013

ADV. DBMS

Time Allotted : 3 Hours

Full Marks : 70

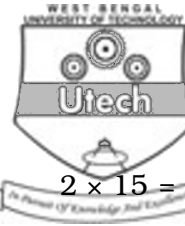
The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer Question No. **1** and any *two* from each Group.

1. Answer any *five* of the following : $5 \times 2 = 10$

- a) Explain the distinction between the term serial schedule and serializable schedule.
- b) Show with the help of a diagram the different steps in query processing.
- c) What is heterogeneous database ?
- d) Explain the working principle of 2PL.
- e) Explain the importance of 'log base recovery' method in DBMS.
- f) What do you mean by 'Object oriented database' ?



GROUP – A

Answer any *two* of the following. $2 \times 15 = 30$

2. a) Let the relations $r1 (A, B, C)$ and $r2 (C, D, E)$ have the following properties. $r1$ has 20000 tuples, $r2$ has 45000 tuples, 25 tuples of $r1$ fit on one block, and 30 tuples of $r2$ fit on one block. Estimate the number of block access required the Nested-loop join strategy for $r1$ and $r2$. 5
- b) What is a recoverable schedule ? Why is recoverability of schedules desirable ? Explain your answer. 5
- c) What is a cascades schedule ? Why is cascadelessness of schedules desirable ? Explain your answer. 5
3. a) Consider the following two transactions :

$T1$: Read (A);

Read (B);

If $A = 0$ then $B := B + 1$;

Write (B);

$T2$: Read (B);

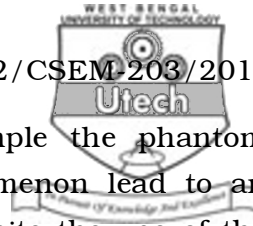
Read (A);

If $B=0$ then $A := A + 1$;

Write (A);

Add lock and unlock instructions to transactions $T1$ and $T2$, so they observe the two-phase locking protocol.

Can the execution of these transactions result in a deadlock ? 7



- b) Explain with the help of an example the phantom phenomenon. Why may this phenomenon lead to an incorrect concurrency execution despite the use of the two-phase locking protocol ? 8
4. a) Explain why log records for transactions on the undo-list must be processed in the reverse order, whereas redo is performed in a forward direction and undo is performed before performing redo. Explain the recovery algorithm in the situation where redo is performed before undo. 10
- b) Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed ? 5

GROUP – B

Answer any *two* of the following.

5. a) What is the difference between a primary index and a secondary index ? What is multilevel index ? 5
- b) Let the following relation schemas be given : $2\frac{1}{2} + 2\frac{1}{2}$

$R = (A, B, C)$

$S = (D, E, F)$

Let relation $r (R)$ and $s (S)$ be given. Give an expression in the tuple relational calculus that is equivalent to each of the following :

- i) $\sigma_{B=17}(r)$
- ii) $\prod_{A, F} (\sigma_{C=D}(r \times s))$.
- c) Explain right outer join and theta join with proper examples and diagram. 5



6. Discuss the relative advantages of centralized and distributed database. What is horizontal and vertical fragmentation ? What do you understand by local and global transaction in distributed database ? What is the role of transaction manager ? Why is it useful to have replication or fragmentation of data ? Explain your answer.

4 + 3 + 2 + 2 + 4

7. Explain RAID level hierarchy. Explain the concept of view and conflict serializability with proper examples. Write short note on Data Warehousing.

5 + 5 + 5
