

Name :

Roll No. :

Invigilator's Signature :

**CS/MCA/SEM-4/MCA-403/2010
2010**

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.*

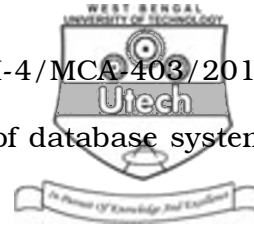
GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$
 - i) The current transaction that permanently stores and begins a new one is called
 - a) roll back
 - b) commit
 - c) view
 - d) conflict serializable.
 - ii) Either all operations of the transaction are reflected properly in the database or none is called
 - a) durability
 - b) consistency
 - c) isolation
 - d) atomicity.
 - iii) work causes the current transaction to abort.
 - a) Consistency
 - b) View
 - c) Roll back
 - d) Commit.



- iv) If a transaction T_i has obtained a share-mode lock on item Q , then T_i can, but cannot
- a) input, read b) input, output
c) output, write d) read, write.
- v) In two-phase locking protocol two phases are
- a) shrink & view b) growing & shrinking
c) roll back & growing d) roll back & commit.
- vi) 4-NF differs from the definition of BCNF in only the use of multivalued dependency instead of
- a) super key
b) candidate
c) functional dependency
d) non-trivial.
- vii) The database is partitioned into some number of fixed length blocks, which are referred to as
- a) segmentation b) fragmentation
c) pages d) view.
- viii) There are two approaches to storing a data in distributed DBMS, & fragmentation.
- a) availability b) replication
c) transparency d) aliases.



- ix) Two main measures of performance of database system are &
- throughput, response time
 - turn around time, throughput
 - response time, turn around time
 - none of these.
- x) If the precedence graph for S has a then schedule S is non-conflicting serializable.
- circular
 - cycle
 - connected
 - non-cycle.

GROUP – B

(Short Answer Type Questions)

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

- Define trivial and non-trivial MVD. What is de-normalization ?
- What is multi valued dependency ? What type of constraints does it specify ? When does it arise ?
- Consider the following relation :

CUSTOMER (Cust id, name, address, city, state, pin). The relation is decomposed into the following relations :
 R1 (Cust id, name, address, pin) and R2 (city, state, pin).
 Examine whether the decomposition leads to DK/NF or not.



5. Assuming the following example discuss the requirement of ACID property :

read (A)
$A := A - 500$
Write (A)
Read (B)
$B := B + 500$
Write (B)

6. How does recovery manager implement shadow-database schema for transaction execution ?

7. What do you mean by 5th normal form ? Consider the relational schema PRODUCTS (agent, company, product). The assumption is that an agent must always sell all products manufactured by the company. Determine with valid explanation whether the following table is in 5th normal form or not :

Agent	Company	Product
A1	C1	P1
A1	C1	P2
A1	C2	P1
A2	C1	P1
A2	C1	P2



GROUP – C

(Long Answer Type Questions)

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

8. a) What do you mean by concurrency control ? Define serializability. 2 + 3
- b) What are the three conditions to be met for view serializability ? 4
- c) An HRD manager has decided to raise the salary of employees working in department number 30 by 15%. Write a PL/SQL block to update the same using implicit cursors. 6
9. a) Test the serializability for the following schedule with explanation. 6

T1	T2	T3	T4	T5
Read (y)	Read (x)			
Read (z)				
				Read (v)
				Read (w)
				Write (w)
	Read (y)			
	Write (y)			
		Write (z)		
Read (u)				
			Read (y)	
			Write (y)	
			Read (z)	
			Write (z)	
Read (u)				
Write (u)				



- b) State the three rules for concurrency control. 3
- c) Define DK/NF.

Consider the relation STUDENT (SID, Grade Level, Building, Fee). Constrains is SID is key; SID must not begin with digit 1. Domain definition are as follows :

SID in DDDD, D is decimal digit
Grade Level in { FR, SO, JR, SN, GR }
Building in char (4)
Fee in DEC (4)

Normalize the above relation to DK/NF with explanation. 2 + 4

10. a) What are the steps taken by RDBMS engine whenever an ANSI SQL statement is executed ? 6
- b) What are the functionalities of OPEN, FETCH and CLOSE commands ? 3
- c) Assume the following table :
- ENGINEERS (eng_id, eng_name, location),
CUSTOMERS (cust_id, cust_name, location, eng_id),
CONTRACT (cont_id, cont_amt, cont_date, cust_id, eng_id)

Write SQL statement for the following :

- i) To list contract received by all engineers who are not in the same location as the customers. 3
- ii) To select highest contract amount in each location. 3



11. a) Describe with example horizontal and vertical fragmentation in Distributed DBMS. 4
- b) Distinguish and differentiate ER-model and object model. 6
- c) Write PL/SQL cursor to display details of Highest 10 salary paid employees. 5
12. a) Discuss the pitfalls of lock-based protocols with proper example. 4
- b) How does database manager handle deadlock situation ? Write two deadlock prevention strategies. 3 + 3
- c) An HRD manager has decided to raise the salary of employees working whose salary is less than Rs. 5,000/- by Rs. 1,000/-. Write PL/SQL code block that does this using an explicit cursor and treat the updation process as single transaction. 5
13. a) What are the similarities of OODBMS and ORDBMS ? 3
- b) What is trigger ? Write down the advantages of triggers. Write a trigger to calculate the sum of two numbers. 2 + 2 + 4
- c) Find out the updating problem caused by a BCNF violation from the following data and give a proper solution. 4

QUARTERLY_BONUS			
<u>emp_id</u>	<u>quarter</u>	<u>ssn</u>	<u>bonus</u>
8857	Q1	999-44-8857	1000
9216	Q1	999-23-9216	500
8857	Q2	999-44-8175	750