

Maulana Abul Kalam Azad University
of Technology, West Bengal



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : CS-601

DATABASE MANAGEMENT SYSTEM

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) Overall logical structure of a database can be graphically represented by
 - a) ER diagram
 - b) Records
 - c) Hierarchy
 - d) Relation.
- ii) Which key cannot be null ?
 - a) Unique key
 - b) Primary key
 - c) Super key
 - d) Foreign key
- iii) Relational calculus is a
 - a) Query language
 - b) Procedural language
 - c) Non-procedural language
 - d) None of these.



- iv) 2 NF is based on
- a) full dependency
 - b) transitive dependency
 - c) functional dependency
 - d) partial dependency.
- v) The information about data in a database is called
- a) Meta data
 - b) Hyper data
 - c) Tera data
 - d) None of these.
- vi) A row from a table is selected by
- a) selection operator
 - b) projection operator
 - c) union operator
 - d) none of these.
- vii) Which data type can store unstructured data
- a) Raw
 - b) Char
 - c) Numeric
 - d) Varchar.
- viii) A normal form in which every non-prime attribute is fully dependent on prime attribute is
- a) 1 NF
 - b) 2 NF
 - c) 3 NF
 - d) BCNF.
- ix) Serializability of concurrent transaction is ensured by
- a) locking
 - b) time stamping
 - c) both (a) and (b)
 - d) none of these.
- x) Transaction follows
- a) ACID properties
 - b) Starvation properties
 - c) Preemption properties
 - d) Non-preemption properties.



GROUP - B

(Short Answer Type Questions)

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

2. What is Data dictionary ? What do you mean by unary operations in Relational algebra ? Give example. $1 + 4$
3. Explain two-phase locking protocol.
4. Consider the relation $R = \{ A, B, C, D, E, F, G, H, I, J \}$ and the set of functional dependencies :

$$F = \{ AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ \}$$

Decompose R into 3 NF.

5. Discuss the different levels of views.
6. What is Weak entity set ? Explain with suitable example.

GROUP - C

(Long Answer Type Questions)

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

7. a) Draw the ER diagram of a hospital management system and explain.
- b) Consider the relation $R = \{ A, B, C, D, E \}$ and the set of functional dependencies :

$$F = \{ AD \rightarrow B, B \rightarrow C, C \rightarrow D \}$$

Find out the candidate key. $10 + 5$

8. a) What do you mean by transaction ? Explain the transaction states.
- b) Explain log based recovery and checkpoints.
- c) What do you mean by shadow paging ?
- d) What do you mean by deadlock handling ? Explain in detail. $6 + 4 + 2 + 3$

9. Consider the employee database :

Employee (emp_name, street, emp_id)

Works (emp_name, company_name, salary)

Company (company_name, city)

Manages (emp_name, manager_name)

Write the appropriate SQL statement on the basis of the above table :

- Find the names and cities of residence of all employees who work for the UBI.
- Find the names, street addresses and cities of residence of all employees who work for the UBI and earn more than Rs. 50,000.
- Find all employees in the database who do not work for UBI.
- Find the 2nd highest salary for employees in UBI.
- Find the company that has the most employees.

5 × 3

10. a) What are the advantages of normalization ?
b) How does BCNF differ from 3rd normal form ?
c) Explain the ACID properties of transactions.

5 + 5 + 5

11. Write short notes on any *three* of the following :

3 × 5 = 15

- File indexing
- B+ tree
- Advantages of DBMS
- Database models
- Inner join and Outer join.

