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 : $10 \times 1 = 10$

   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 :

a) Find the names and cities of residence of all employees who work for the UBI.

b) Find the names, street addresses and cities of residence of all employees who work for the UBI and earn more than Rs. 50,000.

c) Find all employees in the database who do not work for UBI.

d) Find the 2nd highest salary for employees in UBI.

e) 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

a) File indexing

b) *B*+ tree

c) Advantages of DBMS

d) Database models

e) Inner join and Outer join.