



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech(ECE-OLD)/SEM-7/EC-704F/2009-10  
2009**

**DATABASE MANAGEMENT SYSTEM**

Time Allotted : 3 Hours

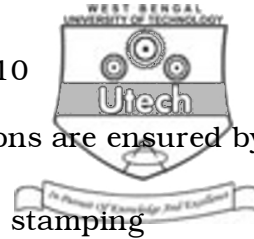
Full Marks : 70

*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 of the following :  $10 \times 1 = 10$ 
  - i) A relation can have more than one
    - a) primary key
    - b) candidate key
    - c) super key
    - d) super key and candidate key.
  - ii) Entity integrity represents that
    - a) there must have a primary key for each relation
    - b) the primary key must be not null
    - c) there may exist a foreign key in each relation
    - d) none of these.



iii) Serializability of concurrent transactions are ensured by

- a) locking
- b) time stamping
- c) both (a) and (b)
- d) none of these.

iv) Check pointing is associated with

- a) log based recovery
- b) non-log based recovery
- c) both (a) and (b)
- d) none of these.

v) A SQL command is given by

```
SELECT Acno
```

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FROM Cust_id
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WHERE Balance BETWEEN 20000 AND 10000
```

This will give

- a) Syntax error
- b) Acno of all tuples having Balance  $\geq 20000$
- c) Acno of all tuples having Balance  $\leq 20000$
- d) Acno of all tuples having Balance between 10000 and 20000.



- vi) A ..... is responsible for authorizing access to database.
- a) application programmer
  - b) DBA
  - c) sophisticated user
  - d) none of these.
- vii) To retrieve all the tuples that are in relation schema  $R_1$  but not in  $R_2$  we use
- a) intersection operation
  - b) Cartesian product operation
  - c) set difference operation
  - d) union operation.
- viii) Which of the following situations is detected by a Precedence graph ?
- a) Deadlock
  - b) Serializability
  - c) Redundancy
  - d) Functional dependency.



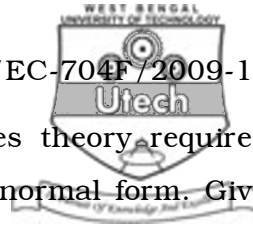
- ix) 2PL is a
- a) concurrency control technique
  - b) recovery mechanism
  - c) deadlock prevention mechanism
  - d) none of these.
- x) Which of the following is true ?
- a) A super key is always a candidate key
  - b) Every 3NF schema is also in BCNF
  - c) Generalization is a bottom-up design approach
  - d) None of these.

**GROUP – B**

**( Short Answer Type Questions )**

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

2. a) Distinguish between File Management System and Database Management System. 3 + 2
- b) Discuss the role of DBA. 3 + 2
3. Compare the advantages and disadvantages of heap and sequential file organizations. If the records are to be processed randomly, which one would you prefer among these two organizations ? Explain your answer. 3 + 2



4. a) Explain why the relational databases theory requires that the relations should be in first normal form. Give an example to show that in representing some entity relationship we may not prefer to design an 1NF scheme.
- b) Show that BCNF implies 3NF. 3 + 2
5. Explain with a suitable diagram the 3-level architecture of database.
6. a) Define weak entity set. Give a proper example.
- b) What are the different integrity constraints in DBMS ? State them. 2 + 3

**GROUP – C**

( Long Answer Type Questions )

Answer any *three* of the following. 3 × 15 = 45

7. a) Draw an E-R diagram between students and course-offering. Make sure that only one relationship exists between a particular student and course-offering pair, you can represent the marks that a student gets in different exams of a course offering. Properly mention cardinalities and weak entities.
- b) Construct appropriate tables for above E-R diagram, for each entity set and relation used over there and mention primary key for each table.



- c) Discuss major advantages and disadvantages of three record based data models

- i) Network
- ii) Hierarchical
- iii) Relational.

6 + 3 + 6

8. Consider the following two schemas :

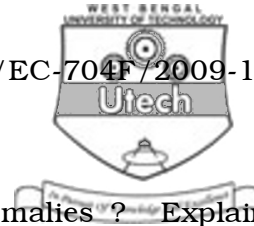
EMP ( EMP#, ENAME, JOB, HIREDATE, MANAGER#,  
SALARY, COMM, DEPT# )

DEPT ( DEPT#, DNAME, LOCATION )

Perform the following queries on the tables ( write appropriate SQL statement )

- a) List the name, salary and PF amounts of all employees  
( PF is calculated as 10% of the basic )
- b) List the number of employees and average salary in  
DEPT# 20
- c) List the department number and total salary payable in  
each department.
- d) List the names of the employees who are more than  
twenty years old in the company.
- e) List the names of the employee whose names either  
start or ends with S.

5 ∞ 3



9. a) What is normalization ?
- b) What are the different types of anomalies ? Explain with example.
- c) Explain the following terms :
- i) Functional dependency
  - ii) Transitive dependency
  - iii) Full functional dependency. 2 + 7 + 6
10. a) With proper example, explain the different types of normal forms ( up to 3 NF ).
- b) Explain with example a relation schema that is in BCNF is also 3NF but, the reverse is not always true. 9 + 6
11. Write short notes on any *three* of the following : 3 × 5
- a) Generalization and aggregation
  - b) Deadlock handling techniques
  - c) Lossless and lossy decomposition
  - d) DBMS users and administrators
  - e) B<sup>+</sup>-Tree organization.
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