



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/BCA/SEM-4/BCA-401/2012  
2012**

**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) The value of the attributes describe a particular
  - a) attribute
  - b) entity
  - c) instance
  - d) none of these.
  
- ii) System catalog is a system created database that describes
  - a) database objects
  - b) data dictionary information
  - c) user access information
  - d) all of these.



iii) DBA is a

- a) Software
- b) Hardware
- c) Person
- d) Others.

iv) To select a tuple from a relational database table, the symbol used in relational algebra is

- a) sigma
- b) pie
- c) lamda
- d) project.

v) Any relation that is not part of the logical model, but is made visible to a user as a virtual relation, is called as

- a) relation
- b) view
- c) tuple
- d) none of these.

vi) Normalization removes

- a) dependency of data
- b) uniqueness of data
- c) redundancy of data
- d) none of these.

vii) Log table is used for

- a) updating
- b) recovery
- c) query
- d) deadlock.



viii) Which is the command in SQL to change the structure in a table ?

- a) Alter
- b) Update
- c) Append
- d) None of these.

ix) A relation is considered to be in second normal form if it is in first normal form and it has no ..... dependencies.

- a) referential
- b) functional
- c) partial
- d) transitive.

x) Cardinality of a table is equal to the

- a) number of rows in the table
- b) number of columns in the table
- c) number of domains of the table
- d) none of these.



**GROUP - B**

**( Short Answer Type Questions )**

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

2. Explain the three schema architecture.
3. Write down the functions of a DBA.
4. Consider the following tables with their functional dependencies –

Professor (Professor\_code, Department, Head\_of\_dept, Percent\_time)

(Department, Professor\_code)  $\rightarrow$  (Head\_of\_dept, Percent time)

Department  $\rightarrow$  (Head\_of\_dept

(Head\_of\_dept, Professor\_code)  $\rightarrow$  (Department, Percent\_time)

It is assumed that —

- i) A professor can work in more than one department
- ii) The percentage of the time he spends in each department is given
- iii) Each department has only one head\_of\_dept.

Normalize the table up to BCNF.



5. What is spurious tuple ? How spurious tuples are generated ?
6. Define super key, candidate key and primary key.

**GROUP - C**

**( Long Answer Type Questions )**

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

7. a) What is the highest NF of each of the following relations ?
- i) R1 ( A, B, C ) with FDs are  $A \rightarrow B, A \rightarrow C, C \rightarrow B$
- ii) R2 ( A, B, C, D ) with FDs are  $A \rightarrow B C, CD \rightarrow B$
- b) Explain generalization, specialization and aggregation in entity relation diagram.
- c) "All primary keys are the super key but the converse is not true". Explain. What is attribute inheritance ?

$4 + 6 + 3 + 2$

8. Define ER model. What is an entity ? What is multi-valued attribute ? Draw the ER diagram from the following information :

"A store has different counters managed by different employee. A counter has item but no two counters have common items. Customers buy from different counters but bill are prepared at the bill counter only. Once in a month the performance of the persons managing different counters are evaluated in terms of sale. Items are also reviewed and slow moving items are identified.

$2 + 2 + 2 + 9$

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9. 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 ) :

- i) List the name, salary and PF amounts of all employees ( PF is calculated as 10% of the basic )
- ii) List the number of employees and average salary in DEPT# 20.
- iii) List the department number and total salary payable in each department.
- iv) List the names of the employees who are more than 20 years old in the company.
- v) List the names of the employees whose name either starts or ends with 'S'. 3 + 3 + 3 + 3 + 3

10 a) Explain ACID properties.

b) Distinguish between logical and physical data dependency.

c) Define 2NF, 3NF, BCNF with proper example. 5 + 4 + 6



11. a) Explain the difference between external, internal and conceptual schemas.
- b) What is multi-level index ?
- c) Explain the query optimization technique with relevant examples.

5 + 5 + 5

