

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.

$2 + 2 + 2 + 9$

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

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