



**ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008**  
**DATABASE MANAGEMENT SYSTEM - I**  
**SEMESTER - 2**

Time : 3 Hours ]

[ Full Marks : 70

**GROUP - A****( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any ten of the following : 10 × 1 = 10
- i) The set of permitted values for each attribute is called its
- a) attribute set b) attribute range
- c) domain d) group.
- ii) The operation on certain relation X, produces Y such that Y contains only selected attributes of X, such an operation is
- a) projection b) selection
- c) union d) difference.
- iii) A table can be logically connected to another table by defining a
- a) a hyperlink b) common field
- c) primary key d) foreign key.
- iv) DDL stands for
- a) data-dictionary language b) dictionary defined language
- c) data defined language d) data definition language.
- v) What is the cardinality of a table with 000 rows & 10 columns ?
- a) 10 b) 100
- c) 1000 d) 10000.
- vi) What operator performs pattern matching in SQL ?
- a) except b) intersect
- c) like d) all of these.

vii) Given relations R (w, x) and S (y, z). The result of

**SELECT DISTINCT w, x  
FROM R, S**

is guaranteed to be same as R, if

- a) R has no duplicates and S is non-empty
- b) R and S have no duplicates
- c) S has no duplicates and R is non-empty
- d) R and S have same number of tuples.

viii) R = (A, B, C)

F = {A → B

B → C}

R is in BCNF

- a) True
- b) False.

ix) R = (J, K, L)

F = {JK → L

L → K}

The candidate keys are

- a) J and K
- b) JK
- c) Only J
- d) JK and JL.

x) Additional schema for relationship set is essential for

- a) many-to-many relationship
- b) many-to-one relationship
- c) one-to-many relationship
- d) none of these.

xi) An attribute of one table matching the primary key of another table is called as

- a) secondary key
- b) foreign key
- c) candidate key
- d) surrogate key.

xii) Truncate is

- a) DDL command
- b) DML command
- c) DCL command
- d) not at all SQL command.



## GROUP - B

## ( Short Answer Type Questions )

Answer any three of the following.

3 × 5 = 15

2. a) What is FD ? 1
- b) 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  $A \rightarrow BC, CD \rightarrow B$ . 4
3. Define : Super key, candidate key, primary key, foreign key and alternate key. 5
4. Define entity integrity and referential integrity. Explain the difference between them through example. 2 + 3
5. Find out closure of attribute set (AG) i.e.,  $(AG)^+$  in the relational schema R and set of functional dependencies F as given below :
- R = ( A, B, C, G, H, I )
- F = { A → B
- A → C
- CG → H
- CG → I
- B → H }
- Is (AG) a super key of R ? 5
6. Consider the relation given below :
- SCHEDULE ( StdId, ClassNo, StdName, StdMajor, ClassTime, Classroom, Instructor )
- Following are functional dependencies of SCHEDULE :
- StdId → StdName
- StdId → StdMajor
- ClassNo → ClassTime
- ClassNo → Classroom
- ClassNo → Instructor
- What is the highest normal form of this relation ? 5

**GROUP - C****( Long Answer Type Questions )**Answer any *three* of the following questions.

3 × 15 = 45

7. a) Consider a university database for the scheduling of classrooms for final exams. This database could be modeled as the single entity set exam, with attributes `course_name`, `section_number`, `room_number` and `time`. Alternatively, one or more additional entity sets could be defined, along with relationship sets to replace some of the attributes of the exam entity set, as
- course with attributes `name`, `department` and `c_number`
  - section with attributes `s_number` and `enrollment` and dependent as a week entity set on `course`.
  - room with attributes `r_number`, `capacity` and `building`.

Draw an E-R diagram for the above problem.

Reduce the E-R diagram into relational schema by defining all the constraints and assumptions.

- b) Explain with example the concept of reducing to relational schema in case specialization and generalization. 10 + 5

8. Consider the following relational schema :

EMP (EmpNo, EmpName, City, Sal, DeptNo)

DEPT (DeptNo, DeptName)

Write down the following queries in SQL :

5 × 3

- Find the names and cities of all employees working for the "Research" department
- Display the number of employees in each department
- Display the names of all employees in department number 20
- Find the names of employees who have the second highest salary
- Find the names of employees whose salary is greater than anyone's salary of department 10.



9. a) What is the difference between primary and secondary storage ?  
b) How does multilevel indexing improve the efficiency of searching an index file ?  
c) How does B-tree differ from a B+tree ?  
d) Why is a B+tree usually preferred as an access structure to a data file ?

3 + 3 + 5 + 4

10. Consider the following relational schema :

STUDENT (Id, Name)

ENROLLEDIN (Id, Code)

SUBJECT (Code, Lecturer)

Write down the following query expressions :

3 x 5

- i) Display the names of students enrolled in the subjects having codes cp 1500 or cp 3010. ( Relational Algebra )  
ii) Display the names of all the students enrolled in the subjects having codes cp 1500. ( Tuple Relational Calculus )  
iii) Display the names of students who are taking a subject not taught by Roger. ( Relational Algebra )
11. a) What is a schedule ?  
b) What is the difference between conflict equivalence and view equivalence ?  
c) Describe the growing phase and shrinking phase with example of the two phase locking protocol.  
d) Describe the wait-die and wound-wait protocols for deadlock prevention.

2 + 4 + 4 + 5

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END