



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 x 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.

II-222511 (4)

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.

II-222511 (4)



GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

3 x 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 \rightarrow B

A \rightarrow C

CG \rightarrow H

CG \rightarrow I

B \rightarrow 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 \rightarrow StdName

StdId \rightarrow StdMajor

ClassNo \rightarrow ClassTime

ClassNo \rightarrow Classroom

ClassNo \rightarrow Instructor

What is the highest normal form of this relation ? 5

II-222511 (4)



GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following questions.

3 x 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
- i) course with attributes name, department and c_number
 - ii) section with attributes s_number and enrollment and dependent as a week entity set on course.
 - iii) 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 x 3

- i) Find the names and cities of all employees working for the "Research" department
- ii) Display the number of employees in each department
- iii) Display the names of all employees in department number 20
- iv) Find the names of employees who have the second highest salary
- v) 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

END