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E – 4208

Reg. No. : .....

Name : .....

Fourth Semester B.Tech. Degree Examination, August 2018
13.405 : DATABASE DESIGN (FR)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. What does defining, manipulating and sharing of database mean ?
2. Explain how GROUP BY clause works. What is the difference between WHERE and HAVING clause ?
3. What do you mean by completeness and soundness of Armstrong's inference rules ?
4. Explain desirable properties of transactions.
5. List the steps followed to process a high level query.

PART – B

Answer **any one** question from **each** Module.

Module – I

6. a) Explain with diagram main phases of database design. **10**
   b) How is aggregation different from ternary relationships ? **6**
   c) Explain distinction between disjoint and overlapping constraints in ER diagrams. **4**

OR

7. a) What is a data model ? What are the various data models ? What is data independence and how does a DBMS support it ? **10**

b) A university wants to set up a database to record details about its faculties and the departments they belong to and courses offered. They intend to record the following information.

- For each faculty member, their identity number, name, job title and salary.
- For each department, its name and address.
- A faculty member can work for more than one department. It is required that every member of staff belongs to at least one department.
- For each department, the head of department. It is required that each department has exactly one head of department.
- Each department offers number of courses, but course cannot be offered by more than one department.
- It is also required keep track of date from each member work in a department.

Draw an ER diagram that expresses the requirements for the database. Make sure that you capture all the constraints on the data mentioned above. **10**

Module – II

8. a) Consider the following relations :

Supplier (sid:integer, sname:string, address:string)

Parts (pid:integer, pname:string, color:string)

Catalog (sid:integer, pid:integer, cost:real)

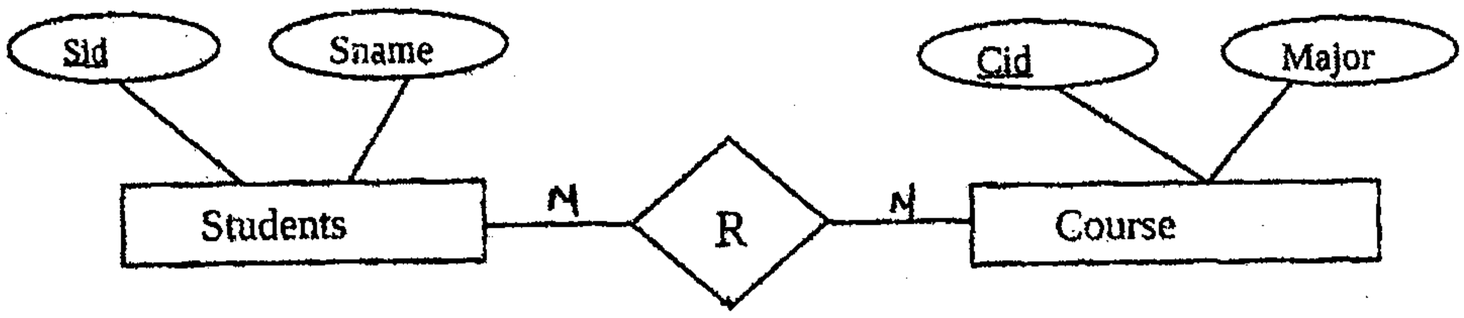
Write the following queries in SQL.

- Find names of suppliers who supply 'red' colored parts.
- Find names of suppliers who supply 'red' and 'green' colored parts.
- Find names of suppliers who supply parts called 'nuts'.
- Find the number of suppliers who supply some parts.
- Find average cost of parts supplied by the supplier, Mr. Ravi.
- Find average cost of each parts supplied by all suppliers. **12**

b) What is Assertion ? How is it different from triggers ? **8**

OR

9. a) Consider the ER diagram. Each student can attend any number courses and course is offered for many students.



i) Identify the set of relations required to map this ER model to a relational model. **3**

ii) Draw a schema diagram showing all relations. **3**

iii) Identify primary key and foreign keys for the relationship 'R'. Write SQL DDL statements for relationship 'R'. **6**

b) How equijoin is different from natural join ? What is left outer join ? Give examples. **8**

Module – III

10. a) Define Boyce-Codd normal form. How does it differ from 3NF ? Why is it considered a stronger form of 3NF ? **10**

b) For the relation schemas given below, identify keys and highest normal form : **10**

i) R(ABCD) and set of dependencies F={A→B, BC→D, A→C}

ii) R(ABCDE) and set of dependencies G = {A→BC, D→AE}

OR

11. a) What is loss less (or non-additive) join property of decomposition ? **6**

b) Suppose you are given with a relation schema R(ABCD) and set of dependencies. F = {A→ BC, C→D}. R(ABCD) is decomposed into R1(ABC) and R2(CD). Is this decomposition loss-less ? **4**

c) What is minimal cover ? Given set of FDs G = {B→A, D→A, AB→D} find minimal cover. **10**

Module – IV

12. a) What are the differences between among primary, secondary and clustering indexes ? How do these differences affect the ways in which these indexes are implemented ? Which of the indexes are dense ? **10**

    b) Describe the structure of B tree nodes. How does B+ tree differ from B tree ? **10**

OR

13. a) What is a serial schedule ? What is serializable schedule ? Explain. **5**

    b) Is the following schedule serializable ?

    r1(X);r3(X);w3(X);w1(X);r2(X). **5**

    c) What is two-phase locking protocol ? How does it guarantee serializability ? **10**