Reg. No. : ....

Name : ....

Fourth Semester B.Tech. Degree Examination, February 2016
13.405 : DATABASE DESIGN (FR)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　Max. Marks : 100

PART – A

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

1. Define the terms candidate key, super key and primary key.

2. How equijoin is different from natural join ?

3. What do you mean by closure set of functional dependencies ? Illustrate with an example.

4. What are ACID properties ?

5. What is lost update problem ? Illustrate with an example.　　　　　　**(4×5 = 20 Marks)**

PART – B

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

Module – I

6. a) Discuss the main characteristics of the database approach and how it differs from traditional file system ?　　　　　　　　　　　　　　　　　　　　**8**

   b) Compare composite and atomic attributes.　　　　　　　　　　　　　　**4**

   c) Discuss user-defined and attribute defined specializations, and identify the differences between them.　　　　　　　　　　　　　　　　　　　　　**8**

OR

7. a) Describe the three-schema architecture. Why do we need mapping between schema levels ?　　　　　　　　　　　　　　　　　　　　　　　　　　**6**

   b) What is the difference between procedural and nonprocedural DML ?　　　**4**

P.T.O.

c) Consider a MOVIE database in which data is recorded about the movie industry.

- Each Movie is identified by title, length in minutes and year of release. A movie can be classified as one or more genres(horror, action, drama). Each movie has a production company and directed by one or more directors. One or more actors appear in each movie.

- Actors are identified by name and date of birth. each actor has a role in the movie.

- Directors are identified by name and address.

- Production companies are identified by name, and location. No movie is produced by more than one production company.

Design and draw Entity-Relationship diagram that expresses the requirements for the movie database.   10

Module – II

8. a) Consider the following relations :

Student(snum: integer, sname: string, major: string, level: string, age: integer)

Course (name: string, meets at: string, room: string, fid: integer)

Enrolled (snum:integer, cname:string)

Faculty(fid:integer, fname: string, salary: real)

Write the following queries in SQL

- Find names of students enrolled for 'Database Design' course.

- Find name of faculty with highest salary.

- Find the names of all Juniors (level = JR) who are enrolled in a course taught by Dr. Santhosh.

- How many students enrolled for 'Database Design' course ?

- For each level, print the level and the average age of students for that level.

                                                                                      12
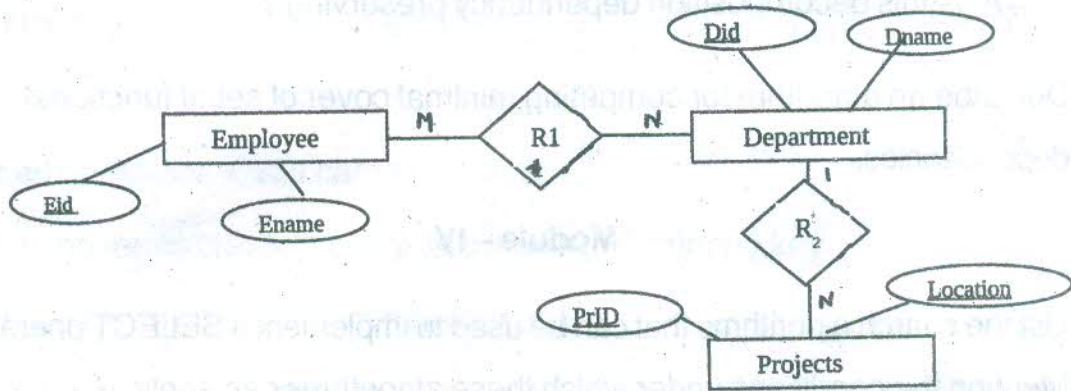
b) Explain integrity and referential integrity constraints. Why each is considered as important ? Explain with an example.   8

OR

9. a) Consider the ER diagram. Each employee can work for any department and department contains many employees. Each department sponsors many project, but a project is sponsored by only one department.

 i) Identify the minimum set of relations required to map this to a relational model. 4

 ii) Draw a schema diagram showing all relations. 4

 iii) Identify primary key and foreign keys required for 'R1' relationship. Write SQL DDL statements for 'R$_1$' relationship. 6

 b) Discuss division operation. Express it using other relational algebra operation. Write an example. 6

Module – III

10. a) Why should NULLs in a relation to be avoided as far as possible ? Discuss the problem of spurious tuples and how we may prevent it . 8

 b) Define 2NF and 3NF. 6

 c) Find out the keys and highest normal of a relation R(ABCDE) with set of dependencies G ={B→AC, D→A, D→E} hold over R. 6

OR

11. a) What is dependency preservation property of decomposition ? Why is it important ? **6**

b) Suppose a relation R with attributes ABC is decomposed into relations with attributes AB and BC. The set of FDs hold over R includes A→B, B→C and C→A. Is this decomposition dependency preserving ? **6**

c) Describe an algorithm for computing minimal cover of set of functional dependencies. **8**

Module – IV

12. a) List the search algorithms that can be used to implement a SELECT operation. Mention the conditions under which these algorithms can apply. **10**

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

OR

13. a) How does B–tree differ from a B+ –tree ? Why B+ – tree usually preferred as an access structure to data file ? **12**

b) What is cascading rollback ? Give an example when cascading rollback is required. **8**