1. Answer the following questions:

a. What are the different types of database users define them

b. Who is database administrator and what are the functions of DBA?

c. What do you mean by database management systems? What is the purpose of database system?

d. What are the advantages of DBMS over File System?

e. What are data models? Describe them in detail.

f. Describe in detail database system structure and application architecture with suitable examples?

2. Draw an ER diagram to model the application with the following assumptions. Specify key attributes of each entity type and (min, max) constraints on each relationship type.

• Each home uniquely defined by home identifier, street address, city, state, a number of bedrooms and a number of bathrooms and an associated owner.

• Each owner has a Social Security Number, first name, last name, phone, and profession.

• An owner can spouse one or more homes.

• Agents represent owners in the sale of a home. An agent can list many homes, but only one agent can list a home.

• An agent has a unique agent number, name, phone number and an associated office.

• When an owner agrees to list a home with an agent, a commission and a selling price are determined.

• An office has office identifier, phone number, the manager name, address and an optional agent number.

• Many agents can work at one office.

• A buyer entity type has a Social Security Number, first name, last name, phone, preferences for the number of bedrooms and bathrooms, and a price range.

• An agent can work with many buyers, but a buyer works with only one agent

3. A database is to be designed for a medium sized Company dealing with industrial applications of computers. The Company delivers various products to its customers ranging from a single application program through to complete installation of hardware with customized software. The Company employs various experts, consultants and supporting staff. All personnel are employed on long‐ term basis, i.e. there is no short‐term or temporary staff. Although the Company is somehow structured for administrative purposes (that is, it is divided into departments headed by department managers) all projects are carried out in an inter‐disciplinary way. For each project a project team is selected, grouping employees from different departments, and a Project Manager (also an employee of the Company) is appointed who is entirely and exclusively responsible for the control of the project, quite independently of the Company's hierarchy. The following is a brief statement of some facts and policies adopted by the Company.

• Each employee works in some department.

• An employee may possess a number of skills.

• Every manager (including the MD) is an employee.

• A department may participate in none/one/many projects.

• At least one department participates in a project.

• An employee may be engaged in none/one/many projects.

• Project teams consist of at least one member.

For the above business stories you are expected to create the following.

a. Analyze the data required.

b. Create the logical data model (ER diagrams).

4. Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.

5. Design a database using ER diagram for a mobile shop. This mobile shop maintains information about entities: customer, mobile, bills and login. Customer has attributes: cid, cname, address, phone, type, the cname is composed of first\_name, middle\_name and last\_name.

• Mobile has attributes: midel, name, brand, IMEINo. A customer may purchase one or more mobile and request only one bill for payment.

• Login has attributes: userid and password.

• Bill has attributes: billno, cname, and amount.

State any assumptions made in the design of the E-R diagram.

6. Make E-R diagram after reading following passage:

Students enroll in college, college hires teachers to teach different course to the students. Students appear in exam. Teachers evaluate exam of each student and publishes obtained marks by each student.

7. Write a SQL query to insert, update and delete.

8. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for.

a. Nested queries.

b. Joined tables and outer joins.

c. Aggregate functions and grouping.

d. Triggers.

e. Assertions and how they differ from triggers.

f. Views and their updatability.

g. Schema change commands.