1. State and Explain the Components of a DBMS

- ✓ **Hardware**Physical devices used to store and access the database. Examples include servers, storage devices, and network interfaces.
- ✓ **Software**The DBMS software itself, responsible for managing and querying the database, and any associated tools or applications.
- ✓ **Data**Organized information stored in tables, views, or other structures, which the DBMS manages.
- ✓ **Users** Categories include:

- ◆ **Database Administrators (DBAs):** Manage and maintain the database.
- ◆ **Developers:** Write and optimize queries.
- ◆ **End Users:** Query the database using applications.

- ✓ **Procedures** Guidelines and rules that govern the design, use, and maintenance of the database.
- ✓ **Query Processor** Converts high-level SQL commands into low-level instructions executable by the DBMS.
- ✓ **Database Engine** Core service for storing, processing, and securing data.

2. What is a Relational Database? Give 4 Examples.

A **relational database** organizes data into **tables (relations)**, where each table contains rows (**tuples**) and columns (**attributes**). The relationships between tables are defined through **keys**.

Examples:

- ◆ MySQL
- ◆ PostgreSQL
- ◆ Microsoft SQL Server
- ◆ Oracle Database

3. State and Explain Three Classifications of SQL

- ✓ **Data Definition Language (DDL):**Commands used to define the structure of the database.Examples: CREATE, ALTER, DROP.
- ✓ **Data Manipulation Language (DML):**Commands used to manipulate data in the database.Examples: INSERT, UPDATE, DELETE, SELECT.
- ✓ **Data Control Language (DCL):**Commands used to control access to data.Examples: GRANT, REVOKE.

4. What is the Difference Between a Primary Key and a Foreign Key?

Primary Key: Uniquely identifies a record in a table. Example: StudentID in a **Students** table while **Foreign Key is** A field in one table that refers to the primary key of another table to establish a relationship Example: ClassID in a **Students** table referencing the ClassID in a **Classes** table.

5. What is an Entity-Relationship Diagram?

An **Entity-Relationship Diagram (ERD)** is a graphical representation of entities, attributes, and relationships in a database.

Entities: Objects or concepts (e.g., Student, Course).

Attributes: Characteristics of entities (e.g., Name, Age).

Relationships: How entities are connected (e.g., "enrolled in").

6. What are the Advantages of Relational Databases?

- ✓ **Data Integrity:**Ensures accuracy and consistency of data using constraints.
- ✓ **Scalability:**Easily scaled to handle increasing amounts of data.
- ✓ **Flexibility:**Allows complex queries using SQL.
- ✓ **Reduced Redundancy:**Normalization minimizes data duplication.
- ✓ **Data Security:**Permissions and encryption protect sensitive information.

7. State Four Types of Data Types Used to Store Data in Tables

- ✓ **Integer (**INT**):**Stores whole numbers.
- ✓ **Character (**CHAR **or** VARCHAR**):** Stores text.
- ✓ **Date/Time (**DATE**,** TIME**):** Stores date or time values.
- ✓ **Floating-Point (**FLOAT**,** DOUBLE**):**Stores numbers with decimals.

8. What is the Purpose of a Database Management System (DBMS)?

The purpose of a DBMS is to provide an efficient, reliable, and secure way to store, retrieve, and manage data.

Key objectives:

- ✓ **Data Organization:** Structuring data for efficient storage and retrieval.
- ✓ **Data Security:** Protecting data from unauthorized access.
- ✓ **Scalability:** Handling growing amounts of data efficiently.
- ✓ **Data Integrity:** Ensuring accuracy and consistency.
- ✓ **Data Sharing:** Enabling multiple users to access data concurrently.