Q1 What is DBMS? Explain its purpose.

A database management system (DBMS) is a software designed to assist in maintaining and utilizing large collections of data. The need for such systems, as well as their use, is growing rapidly. Database management continues to gain importance as more and more data is brought online and made ever more accessible through computer networking. Commercially, database management systems represent one of the largest and most vigorous market segments.

Q2 Differentiate between DBMS and File System.

DBMS	File System
It is a system to store files, when security constraints are high.	It is a system to store files, which require less security constraints.
Data Redundancy & Inconsistency is less.	Data Redundancy & Inconsistency is more.
Centralisation is achieved.	Centralisation is hard to achieve.
It stores structured data, which have well defined constraints and interrelation.	It stores unstructured data as isolated data files/entities.

Q3 Explain the following terms:

a) Data Abstraction – Database systems are made-up of complex data structures. To ease the user interaction with database, the developers hide internal irrelevant details from users. This process is called data abstraction. There are 3 levels of data abstraction:
   i.   Physical Level
   ii. Logical Level
   iii. View Level

b) Relational Data Model – In a relational data model, the data and relationships are represented by collection of inter-related tables. Each table is a group of column and rows, where column represents attribute of an entity and rows represents records.

Q4 Explain Different Data models

There are many kinds of data models. Some of the most common ones include:

1. Relational model – It is the most common data model sorts the data into tables, also known as relations, each of which consists of columns and rows. Within the database, tables can be normalized, or brought to comply with normalization rules that make the database flexible, adaptable, and scalable. Relational databases are typically written in Structured Query Language (SQL).
2. Hierarchical model – This model organizes data into a tree-like structure, where each record has a single parent or root. Sibling records are sorted in a particular order. That order is used as the physical order for storing the database.
3. Network model – The network model builds on the hierarchical model by allowing many-to-many relationships between linked records, implying multiple parent records. Based on mathematical set theory, the model is constructed with sets of related records. Each set consists of one owner or parent record and one or more member or child records. A record can be a member or child in multiple sets, allowing this model to convey complex relationships.

4. Object-oriented model – This model defines a database as a collection of objects, or reusable software elements, with associated features and methods. There are several kinds of object-oriented databases:
   - A multimedia database incorporates media, such as images, that could not be stored in a relational database.
   - A hypertext database allows any object to link to any other object. It is useful for organizing lots of disparate data, but it's not ideal for numerical analysis.

Q6

a) DML Compiler – It translates DML statements in a query language into low-level instruction that the query evaluation engine can understand.

b) Extension – The extension of a given relation is the set of tuples appearing in that relation at any given instance. It changes as tuples are created, destroyed, and updated.

c) Intension - The intension of a given relation is independent of time. It is the permanent part of the relation. It corresponds to what is specified in the relational schema. The intension thus defines all permissible extensions.

d) DBMS Kernel – A DBMS kernel is a type of database. It is usually used in the architecture business world and it consists of software and system-level data structures.

e) Catalog – A catalog is a directory of information about data sets, files, or a database. It usually describes where a data set, file or database entity is located.

Q7

The ER model defines the conceptual view of a database. It works around real-world entities and the associations among them. At view level, the ER model is considered a good option for designing databases.

- Entity – An entity can be a real-world object, either animate or inanimate, that can be easily identifiable.
- Entity Set – An entity set is a collection of similar types of entities. An entity set may contain entities with attribute sharing similar values.
- Attribute – Entities are represented by means of their properties, called attributes. All attributes have values.
- Relationship – The association among entities is called a relationship.
- Relationship Set – A set of relationships of similar type is called a relationship set.