1. **Consider the task given below**

Task: "Find all gated community villas located on a major highway between two cities."

For the task given above, Find out

a. What is the database type needed for this query execution?
Spatial database
GIS
Location analysis

b. What type of query processing is used here? Explain it.
Spatial joins or overlays. Typically joins the objects of two types based on some spatial condition, such as the objects intersecting or overlapping spatially or being within a certain distance of one another. For example, find all townships located on a major highway between two cities

c. What kind of indexing suits best for organizing the data objects used in the query?

A spatial join index precomputes a spatial join operation and stores the pointers to the related object in an index structure. Join indexes improve the performance of recurring join queries over tables that have low update rates.

Spatial join conditions are used to answer queries such as "Create a list of highway-river combinations that cross." The spatial join is used to identify and retrieve these pairs of objects that satisfy the *cross* spatial relationship.

Because computing the results of spatial relationships is generally time consuming, the result can be computed once and stored in a table that has the pairs of object identifiers (or tuple ids) that satisfy the spatial relationship, which is essentially the join index.

2. a. Suggest the database suitable for the digital library implementation.
Multimedia Database
b. Storage and retrieval

c. Explain the method used in object recognition which can extract features invariant to image scaling and rotation, and partially invariant?

This approach is called **scale-invariant feature transform (SIFT)**. The SIFT features are invariant to image scaling and rotation, and partially invariant to change in illumination and 3D camera viewpoint. They are well localized in both the spatial and frequency domains, reducing the probability of disruption by occlusion, clutter, or noise. In addition, the features are highly distinctive, which allows a single feature to be correctly matched with high probability against a large database of features, providing a basis for object and scene recognition.

3. **Cloud databases profoundly changes job roles, so explain about the changes happened in the traditional works of DBA.**
Installing the racks and cabling • Installing, patching, and upgrading database software • Creating and configuring database instances • Managing users, roles, and permissions • Backup and recovery • Securing the data, including the encryption of critical data • Data migration, ingestion, and export • Performance tuning • Database monitoring and troubleshooting • Handling high availability • Assisting database developers and analysts in their databaserelated tasks

Specific Tasks

- Planning operational costs
- Effects on architecture and application design
- Tracking license compliance

4. Consider a scenario where a sales representative working for the ABX Corporation have to update his sale details as soon as he had sold a product.

a. What type of database is suitable to implement this scenario?

Mobile database

b. List out the requirements needed for this database implementation and explain any three in detail.

Mobile DBMSs should satisfy the following requirements:

- Small memory footprint.
- Flash-optimized storage system.
- Data synchronization.
- Security.
- Low power consumption.
- Self-management.
- Embeddable in applications.

c. Draw the architecture to implement the scenario.