Q1. What is RDBMS? Why do industries use RDBMS?

- Answer: RDBMS stands for Relational Database Management System. It's a software system used to manage relational databases. Industries use RDBMS to store, retrieve, and manage structured data efficiently. It ensures data integrity, enforces relationships, and allows for complex queries.

Q2. Explain the relationship data model in depth.

- Answer: The relationship data model is a way to represent and structure data in tables with defined relationships between them. Tables represent entities, and relationships depict connections between these entities. Primary keys and foreign keys establish these relationships, enabling efficient querying and data integrity.

Q3. What is the importance of Relationships in a Database management system? Explain the types of relationships.

- Answer: Relationships ensure data consistency and accuracy. Types of relationships:

- One-to-One: Each entity in one table matches exactly one entity in another.

- One-to-Many: One entity in the first table relates to multiple entities in the second.

- Many-to-One: Multiple entities in the first table link to one entity in the second.

- Many-to-Many: Multiple entities in both tables connect to each other.

Q4. Explain the different types of Keys in RDBMS considering a real-life scenario.

- Answer: In a library database, consider:

- Primary Key: ISBN of a book, uniquely identifying each book.

- Foreign Key: Author ID in the Books table referencing the Authors table.

- Candidate Key: Book Title + Author ID, also uniquely identifying books.

- Alternate Key: ISBN, which could serve as an alternative primary key.

Q5. Write a short note on Single Responsibility Principle.

- Answer: Single Responsibility Principle (SRP) states that a module or class should have only one reason to change. In the context of databases, it means tables should have a clear purpose, reducing complexity and making maintenance easier.

Q6. Explain the different types of errors that could arise in a denormalized database.

- Answer: In a denormalized database, errors can include:

- Data Redundancy: Same data repeated, causing inconsistencies.

- Update Anomalies: Changing data requires multiple updates.

- Insertion Anomalies: Adding data without complete information.

- Deletion Anomalies: Removing data leads to unintended loss.

Q7. What is normalization and what is the need for normalization?

- Answer: Normalization is the process of organizing a database to minimize data redundancy and ensure data integrity. The need for normalization arises to eliminate data anomalies, improve maintainability, and enhance query efficiency.

Q8. List out the different levels of Normalization and explain them in detail.

- Answer: Normalization levels:

- 1NF: Eliminate repeating groups; attributes contain atomic values.

- 2NF: Meet 1NF and eliminate partial dependencies.

- 3NF: Meet 2NF and eliminate transitive dependencies.

- BCNF: Meet 3NF and ensure non-key attributes depend solely on the primary key.

- 4NF: Meet BCNF and address multi-valued dependencies.

Q9. What are joins and why do we need them?

- Answer: Joins combine data from multiple tables based on related columns. They're needed to retrieve meaningful insights by linking related information stored in separate tables.

Q10. Explain the different types of joins?

- Answer: Types of joins:

- Inner Join: Returns matched rows from both tables.

- Left Join: Returns all rows from the left table and matching rows from the right.

- Right Join: Returns all rows from the right table and matching rows from the left.

- Full Outer Join: Returns all rows from both tables, along with matching rows.

Please let me know if you need further clarification or more information on any of these topics!