1. **What database models do you know?**

* Relational(table), hierarchical (tree), Network/ graph, Object-oriented

1. **Which are the main functions performed by a Relational Database Management System (RDBMS)?**

* Data integrity, concurrency….

Creating / altering / deleting tables and relationships between them (database schema)

Adding, changing, deleting, searching and retrieving of data stored in the tables

Support for the SQL language

Transaction management

1. **Define what is "table" in database terms.**

* Table is an information holder that resembles real-life area of characteristics related to a given set of objects

Database tables consist of data, arranged in rows and columns. All rows have the same structure. Columns have name and type (number, string, date, image, or other)

1. **Explain the difference between a primary and a foreign key.**

* A primary key is a unique identifier upon which all table rows are matched upon and are dependent upon. It is a constraint that makes each table record unique. A foreign key is another table’s primary key that has been included in the current table as a record that corresponds to such data row in the other table that has this key as a primary key.

1. **Explain the different kinds of relationships between tables in relational databases.**

* One to one, One to Many, Many to Many and so on… Meaning that to one/ many records in one table correspond/s to one/ many in another.

1. **When is a certain database schema normalized? What are the advantages of normalized databases?**

* When there are no repeating data in any given rows and the given table columns are solely dependent on the primary key only and not any column. Usually it is said to be normalized in the 3rd Normal Form or BCNF (Boyce – Codd Normal Form)

1. **What are database integrity constraints and when are they used?**

* They ensure data integrity in the database tables. Enforce data rules which can not be violated. Primary key constraint – ensuring that for a given table each data row has a unique data field. Unique key constraint – ensures that all values in a certain column (or group of columns) are unique. Foreign key constraint – ensures that the value in a given column is a key from another table. Check constraint – ensures that values in a certain column meet some predefined condition

1. **Point out the pros and cons of using indexes in a database.**

* Quicker search data retrieval is a pro and a con is latency when adding/ removing data from a table. Indices should be used for big tables only.

1. **What's the main purpose of the SQL language?**

* To retrieve/ manipulate the stored in tables/ data schemas information. Via commands and operations to create, alter, delete table’s and other objects information.

1. **What are transactions used for? Give an example.**

* Transactions are used to keep data integrity. They are a sequence of operations that are either executed as a unit (whole) or not at all – there isn’t a third option, but the two given only!! As an example is a bank transfer from one account to another – in this case either the whole sum gets transferred or none.

1. **What is a NoSQL database?**

* It is a non-relational database, where each data record is a document. It used a document-based model. It is a schema-free document storage – supports all main operational characteristics of the relational databases. Has great performance and scalability. It is optimized for append and retrieve.

1. **Explain the classical non-relational data models.**

* Relational databases – data stored as table rows, relationships between related rows, single entities spans multiple tables, RDBMS are very mature, rock solid.

NoSQL databases – data stored as documents, single entities (document) is a single record, documents don’t have a fixed structure.

Document model – set of documents, like JSON strings

Key-value model – set of key-value pairs

Hierarchical key-value – Hierarchy of key-value pairs

Wide-column model – Key-value model with schema

Object model – set of OOP-style objects

1. **Give few examples of NoSQL databases and their pros and cons.**

* Redis – Ultra fast in-memory data structure server
* MongoDB – Mature and powerful JSON-document database
* CouchDB - JSON-based document database with REST API
* Cassandra – Distributed wide-column database

Relational databases are number one world wide in terms of commercial use, NoSQL databases are only 10% of the world commercial usage.