Question 1: **What database models do you know?**

1. Hierarchical model – the data is organized in a tree-like structure. The data is connected through links. The data is stored as records. Each record must have exactly one parent, but can have one or more child records.
2. Network model – unlike the hierarchical model, the network model’s records can have more than one parent record.
3. Relational model – the data is organized as a set of tables which are related in some way. The data can be accessed in many different ways without reorganizing.
4. Object-oriented model – the data is represented in the form of objects just like in OOP. It is not table oriented.

Question 2: **Which are the main functions performed by a Relational Database Management System (RDBMS)?**

Management system in which the data is stored in the form of tables which are related. The main functions are creating, altering, deleting tables and relationships between them, adding, changing, deleting, searching and retrieving data from or to the tables, support for the SQL language.

Question 3: **Define what is "table" in database terms.**

**I**n [relational databases](http://en.wikipedia.org/wiki/Relational_database), a table is a set of data elements using a model of vertical and horizontal [rows](http://en.wikipedia.org/wiki/Row_(database)), the [cell](http://en.wikipedia.org/w/index.php?title=Cell_(database)&action=edit&redlink=1) being the unit where a row and column intersect. A table has a specified number of columns, but can have any number of rows. Each row is identified by the values appearing in a particular column subset which has been identified as a [unique key](http://en.wikipedia.org/wiki/Unique_key) index.

Question 4: **Explain the difference between a primary and a foreign key.**

A primary key is the unique key for a table (ID).It cannot be null or duplicated while a foreign key can. A foreign key refers to a primary key in another table defining the relationship between the two tables.

Question 5: **Explain the different kinds of relationships between tables in relational databases.**

1. One-to-many - a single record in the first table has many corresponding records in the second table. A country has a lot of towns.
2. Many-to-many - the records in the first table have many corresponding records in the second table and vice versa. A student can enroll several courses, and each course can be enrolled by many students.
3. One-to-one – a single record in a table corresponds to a single record in the second table. Let’s say we have 2 tables. The first one has the first, last name and Personal ID of people and second has general information of those people (Height, age, education etc.). One record in the first table is linked to only one record in the second one.

Question 6: **When is a certain database schema normalized? What are the advantages of normalized databases?**

A database is normalized when the repeating data is removed. The advantages are: smaller tables, faster searching, less redundant data, cleaner looking tables.

Question 7: **What are database integrity constraints and when are they used?**

Integrity constraints refer to maintaining and assuring the accuracy of the data. It aims to prevent unintentional changes.

Question 8: **Point out the pros and cons of using indexes in a database.**

They speed up searching of values in a certain column or group of columns. The cons are that adding and deleting records in indexed tables is slower. Indices should be used on tables with more than 50 000 rows.

Questions 9: **What's the main purpose of the SQL language?**

The main purpose of the SQL language is to manipulate relational databases – create, alter, delete tables and other objects in the database.

Question 10: **What are transactions used for? Give an example.**

Transactions provide an “all-or-nothing” proposition, which means that every performed action must be completed in its entirety or have no effect whatsoever.

Example: a bank transfer from one account to another.

Question 11: **What is a NoSQL database?**

NoSQL or Not Only SQL database provides a mechanism for storage and retrieval of data that is modeled in a different way than the tabular relations used in relational databases. They are used for their simple design.

Question 13: **Give few examples of NoSQL databases and their pros and cons.**

Data stored as a document with no relationships between them. A document about a person and his information: name, gender, phone, address, email, site. Another database can be a JSON based document used in REST API. The pros are great performance and no fixed structure. The cons are no indexing support like in relational databases, absence of standardization.