

SQL INTERVIEW Q&A



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1) What is SQL, and what is its purpose in data analysis?

Ans: SQL (Structured Query Language) is a standard language for managing and manipulating relational databases. It allows analysts to query, update, and manage data effectively, which is crucial for data analysis tasks.

2) What types of SQL commands (or SQL subsets) do you know?

Ans: Data Definition Language (DDL) – to define and modify the structure of a database.

Data Manipulation Language (DML) – to access, manipulate, and modify data in a database.

Data Control Language (DCL) – to control user access to the data in the database and give or revoke privileges to a specific user or a group of users.

Transaction Control Language (TCL) – to control transactions in a database.

Data Query Language (DQL) – to perform queries on the data in a database to retrieve the necessary information from it.



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3) What are the main applications of SQL?

Ans: Using SQL, we can:

create, delete, and update tables in a database
access, manipulate, and modify data in a table
retrieve and summarize the necessary information from a table or several tables
add or remove certain rows or columns from a table

4) What is a primary key?

Ans: A column (or multiple columns) of a table to which the PRIMARY KEY constraint was imposed to ensure unique and non-null values in that column. In other words, a primary key is a combination of the NOT NULL and UNIQUE constraints. The primary key uniquely identifies each record of the table. Each table should contain a primary key and can't contain more than one primary key.

5) What SQL constraints do you know?

Ans: DEFAULT – provides a default value for a column.

UNIQUE – allows only unique values.

NOT NULL – allows only non-null values.

PRIMARY KEY – allows only unique and strictly non-null values (NOT NULL and UNIQUE).

FOREIGN KEY – provides shared keys between two or more tables.



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6) What types of joins do you know?

Ans: (INNER) JOIN – returns only those records that satisfy a defined join condition in both (or all) tables. It's a default SQL join.

LEFT (OUTER) JOIN – returns all records from the left table and those records from the right table that satisfy a defined join condition.

RIGHT (OUTER) JOIN – returns all records from the right table and those records from the left table that satisfy a defined join condition.

FULL (OUTER) JOIN – returns all records from both (or all) tables. It can be considered as a combination of left and right joins.

7) What is FOREIGN KEY?

Ans: A FOREIGN KEY constraint is a fundamental concept in relational databases, ensuring data integrity by enforcing relationships between tables. By linking a child table to a parent table, the foreign key establishes referential integrity. This constraint ensures that the values in the foreign key column match the primary key values in the referenced table, thereby maintaining consistent and valid data across the database.

8) How do you find the last id in a table?

Ans: Using the MAX() function. Otherwise, in many SQL versions, we can use the following syntax:

Ans:

```
SELECT id  
FROM table_name  
ORDER BY id DESC  
LIMIT 1;
```

9) How to Identify Duplicate Rows

Ans: We Use the GROUP BY clause with the COUNT(*) function to find rows with duplicate values. This step helps us group the records by specific columns and count how many times each combination occurs, making it easier to identify duplicates that appear more than once in the table.

```
SELECT EMPNAME, DEPT, CONTACTNO, CITY,  
COUNT(*) FROM DETAILS  
GROUP BY EMPNAME, DEPT, CONTACTNO, CITY  
HAVING COUNT(*)>1;
```



10) Find Top 3 Highest paid employee

Ans: Select top 3 * from employee

Group by salary desc;

11) Find Second Highest Salary

Ans: Select max(salary) from employee

where salary<(select max(salary) from employee);

12) Write a SQL query to fetch "FIRST_NAME" from the Student table in upper case and use ALIAS name as STUDENT_NAME.

Ans: SELECT upper(FIRST_NAME) as STUDENT_NAME from Student;

13) Write a SQL query to fetch unique values of MAJOR Subjects from Student table.

Ans: SELECT DISTINCT MAJOR from STUDENT;



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14) Write a SQL query to print the first 3 characters of FIRST_NAME from Student table.

Ans: SELECT SUBSTRING(FIRST_NAME, 1, 3) FROM Student;

15) Write a SQL query to find the position of alphabet ('a') int the first name column 'Shivansh' from Student table.

Ans: SELECT INSTR(LOWER(FIRST_NAME), 'a') FROM Student WHERE FIRST_NAME = 'Shivansh';

16) Write a SQL query that fetches the unique values of MAJOR Subjects from Student table and print its length.

Ans: SELECT DISTINCT MAJOR, LENGTH(MAJOR) FROM Student;

17) Write a SQL query to print FIRST_NAME from the Student table after replacing 'a' with 'A'.

Ans: SELECT REPLACE(FIRST_NAME, 'a', 'A') FROM Student;



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18) Write a SQL query to print details of the Students with the FIRST_NAME as 'Prem' and 'Shivansh' from Student table.

Ans: `SELECT * from Student WHERE FIRST_NAME IN ('Prem', 'Shivansh');`

19) Write an SQL query to show only odd rows from Student table.

Ans: `SELECT * FROM Student WHERE student_id % 2 != 0;`

20) What is the difference between *RANK(), DENSE_RANK(), and ROW_NUMBER()?*

Ans: All are window functions used for ranking, but behave differently with ties:

`ROW\NUMBER()` → Always gives a unique sequence (no duplicates).

`RANK()` → Gives the same rank to ties, but skips the next rank(s).

`DENSE_RANK()` → Gives the same rank to ties, but does *not skip* the next rank.

21) How can you find the *Nth highest salary* in SQL?

Ans: SELECT DISTINCT salary

FROM employees

ORDER BY salary DESC

LIMIT 1 OFFSET 2; -- N=3

22) What is a *CTE (Common Table Expression)* and when to use it?

Ans: A CTE (WITH clause) is a temporary result set that improves readability and can be referenced multiple times.

WITH avg_salary AS (

SELECT department_id, AVG(salary) AS avg_sal

FROM employees

GROUP BY department_id

)

SELECT e.name, e.salary, a.avg_sal

FROM employees e

JOIN avg_salary a ON e.department_id = a.department_id;



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23) Explain window functions and how they differ from GROUP BY.

Ans: GROUP BY aggregates rows → reduces the number of rows.

Window functions (OVER) compute aggregations *without reducing rows.

-- GROUP BY

```
SELECT department_id, AVG(salary)
```

```
FROM employees
```

```
GROUP BY department_id;
```

-- Window Function

```
SELECT name, department_id,
```

```
AVG(salary) OVER (PARTITION BY department_id) AS avg_sal
```

```
FROM employees;
```

24) How to get *running totals* or cumulative sums?

Ans: SELECT name, salary,

```
SUM(salary) OVER (ORDER BY hire_date) AS running_total
```

```
FROM employees;
```

25) What is the difference between **DELETE, TRUNCATE, and DROP?

Ans: DELETE → Removes rows (can use WHERE, logged, slower).

TRUNCATE → Removes all rows (no WHERE, faster, minimal logging).

DROP → Removes entire table (structure + data).



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26) How do you find *gaps in data* (missing dates or IDs)?

Ans: WITH all_dates AS (SELECT generate_series('2025-01-01'::date, '2025-01-10'::date, interval '1 day') AS dt)
SELECT a.dt
FROM all_dates a
LEFT JOIN sales s ON a.dt = s.sale_date
WHERE s.sale_date IS NULL;

27) How to pivot/unpivot data in SQL?

Ans: SELECT department,
SUM(CASE WHEN gender = 'M' THEN salary END) AS male_salary,
SUM(CASE WHEN gender = 'F' THEN salary END) AS female_salary
FROM employees
GROUP BY department;
Unpivoting (columns → rows):
SELECT department, 'M' AS gender, male_salary AS salary FROM salaries
UNION ALL
SELECT department, 'F' AS gender, female_salary AS salary FROM salaries;



28) Write a query to find the ‘Nth’ highest salary from the employee table (e.g., 5th highest salary).

Ans: `SELECT DISTINCT salary`

`FROM employees`

`ORDER BY salary DESC`

`LIMIT 1 OFFSET (N-1);`

29) Write a query to find the first purchase date of each customer.

Ans: `SELECT customer_id, MIN(order_date) AS first_purchase_date`

`FROM orders`

`GROUP BY customer_id;`

30) Write a query to identify customers who made a purchase every month for the past year.

Ans: `SELECT customer_id`

`FROM orders`

`WHERE order_date >= DATE_SUB(CURDATE(), INTERVAL 1 YEAR)`

`GROUP BY customer_id`

`HAVING COUNT(DISTINCT MONTH(order_date)) = 12;`



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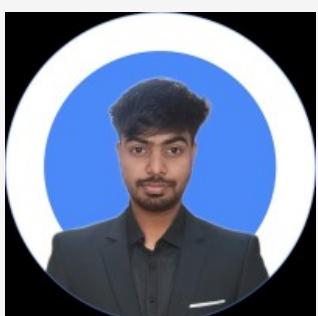
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