**IMPORTANT INTERVIEW QUESTIONS FOR SQL**

**Basic SQL Questions**

1. What is SQL, and why is it important for data management?
2. What are the different types of SQL commands (DDL, DML, DCL, TCL)?
3. What is the difference between **INNER JOIN** and **OUTER JOIN**?
4. How do you retrieve unique values from a column in SQL?
5. Explain the difference between **WHERE** and **HAVING** clauses.
6. What is the purpose of the **GROUP BY** clause in SQL?
7. How do you create a table in SQL? Can you give an example?
8. What is the purpose of a **primary key** in a database table?
9. How can you delete duplicate rows in SQL?
10. What is a **subquery**, and how is it used in SQL?
11. What are the differences between **UNION** and **UNION ALL**?
12. How do you find the **second highest salary** in a table?
13. What is a **stored procedure** in SQL, and why would you use one?
14. Explain the purpose of the **COUNT** function in SQL.
15. What is **normalization**, and why is it important in databases?
16. How do you write an SQL query to **join three tables**?
17. What is the difference between **DELETE**, **TRUNCATE**, and **DROP**?
18. What are **CHAR** and **VARCHAR** data types?
19. What is the difference between **BETWEEN** and **IN** operators in SQL?
20. What are **constraints** in SQL, and what are their types?

## **Intermediate SQL Questions**

1. What are **composite keys**?
2. What is a **foreign key**, and why is it used?
3. Explain **self-join** and when it is used.
4. How does the **LIKE** operator work?
5. What are **indexes**, and why are they used?
6. How do you handle **NULL** values in SQL?
7. What is a **default constraint**?
8. What is a **CHECK constraint**?
9. What is the **COALESCE** function in SQL?
10. What is the difference between **HAVING** and **GROUP BY**?
11. How do you implement **cascading deletes** in SQL?
12. What is the **EXISTS** operator in SQL?
13. What is the difference between **ROW\_NUMBER()**, **RANK()**, and **DENSE\_RANK()**?
14. What are **window functions** in SQL?
15. How do you convert data types in SQL?
16. What are **triggers** in SQL?
17. What is a **view**, and how is it different from a table?
18. What is the difference between **static views** and **dynamic views**?
19. How do you use the **CASE** statement in SQL?
20. What are **cursors**, and how are they used?

## **Advanced SQL Questions**

1. What is **denormalization**, and when is it useful?
2. Explain **ACID properties** in a database.
3. What is a **transaction**, and how does it work?
4. What is the difference between **COMMIT**, **ROLLBACK**, and **SAVEPOINT**?
5. What are the different types of **JOINs** in SQL?
6. What is **sharding** in databases?
7. What is **partitioning**, and how does it improve performance?
8. What is a **materialized view**?
9. How do you optimize SQL queries for better performance?
10. What are **common table expressions (CTEs)**?
11. What is a **correlated subquery**?
12. How do you detect and handle **deadlocks** in SQL?
13. What are **temporary tables**, and when are they used?
14. What is a **recursive query** in SQL?
15. Explain **bitwise operators** in SQL.
16. How do you perform **full-text search** in SQL?
17. What are **aggregate functions** in SQL?
18. What is a **JSON column** in SQL?
19. What is the **MERGE statement** in SQL?
20. How do you handle **large datasets** in SQL efficiently?

## **SQL Query-Based Questions**

1. Write a query to find **the third highest salary** in a table.
2. How do you retrieve **the first and last records** from a table?
3. Write a query to **count the number of employees** in each department.
4. Write an SQL query to find **duplicate records** in a table.
5. Write a query to find **employees who earn more than their managers**.
6. How do you select **random records** from a table?
7. Write an SQL query to **fetch the top 5 highest salaries**.
8. Write a query to display **all departments with no employees**.
9. How do you swap two column values in a table?
10. Write an SQL query to **find the most repeated value in a column**.
11. Write an SQL query to display **departments with more than 10 employees**.
12. Write an SQL query to find **employees who joined in the last 3 months**.
13. Write a query to find **the difference between the highest and lowest salary**.
14. Write an SQL query to find **employees with the same salary**.
15. Write an SQL query to calculate the **cumulative sum** of salaries.
16. Write an SQL query to display **only even or odd ID numbers**.
17. How do you extract only the **date portion** from a DATETIME column?
18. How do you retrieve **the first three characters of a column**?
19. Write an SQL query to list **employees hired in a specific year**.
20. Write an SQL query to show **employees whose names start with ‘A’**.

## **Database Design & Optimization Questions**

1. What are **best practices** for writing SQL queries?
2. What is the difference between **OLTP and OLAP**?
3. What is **data warehousing**?
4. How do you improve query performance?
5. What is **database indexing**, and what are its types?
6. What is the difference between **clustered and non-clustered indexes**?
7. What is **referential integrity**?
8. What are **hash indexes**?
9. How do you design a database schema for an **e-commerce website**?
10. What is **vertical and horizontal scaling**?

## **Miscellaneous & Theoretical Questions**

1. What is the difference between **SQL and NoSQL** databases?
2. Explain the concept of **star schema and snowflake schema**.
3. What is **ETL (Extract, Transform, Load)** in SQL?
4. What is the difference between **relational and non-relational databases**?
5. What are **foreign key constraints**, and how do they help maintain data integrity?
6. What is **data redundancy**, and how does normalization prevent it?
7. What is the difference between **procedural and declarative SQL**?
8. What is a **data dictionary** in SQL?
9. What is the difference between **strong and weak entity types**?
10. How does SQL handle **concurrent transactions**?

BONUS QUESTIONS:

1. How do you sort query results in **ascending or descending** order?
2. What is the difference between DELETE, TRUNCATE, and DROP?
3. How do you use the LIKE operator in SQL?
4. What are SQL constraints? Can you list some common ones?
5. How do you update data in SQL?
6. What is the BETWEEN operator in SQL?
7. How do you use the IN operator in SQL?
8. What is the difference between a clustered and a non-clustered index?
9. How do you optimize SQL queries for performance?
10. What are SQL views, and why are they used?
11. How do you implement indexing in SQL?
12. What is the COALESCE function, and how is it used?
13. Explain the concept of window functions in SQL.
14. How do you perform a self-join in SQL?
15. What are common table expressions (CTEs) in SQL?
16. How do you perform pivot and unpivot operations in SQL?
17. What is the CASE statement in SQL, and how is it used?
18. What is the difference between OLTP and OLAP databases?
19. How does database partitioning work?
20. What are ACID properties in a database?
21. How does indexing impact SQL performance?
22. What is sharding in databases?
23. How do you handle deadlocks in SQL?
24. What is the difference between SQL and NoSQL databases?
25. How do you implement stored procedures with parameters?
26. What is database replication, and what are its types?
27. How do triggers work in SQL?