SQL Server Interview Questions & Answers

1. What is SQL Server and how does it differ from other RDBMSs?

Answer: SQL Server is a relational database system by Microsoft. It is similar to other RDBMSs but integrates well with Windows and .NET.

2. What are the different types of JOINs in SQL Server?

Answer: INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN, CROSS JOIN.

3. What is the difference between WHERE and HAVING clauses?

Answer: WHERE filters rows before grouping; HAVING filters groups after grouping.

4. How do you retrieve unique records from a table?

Answer: Use SELECT DISTINCT column_name FROM table_name.

5. What is the use of GROUP BY? Give an example.

Answer: It groups rows that have the same values. Example: GROUP BY department.

6. What is normalization? Explain its different forms.

Answer: Normalization organizes data to reduce redundancy. Forms: 1NF, 2NF, 3NF, etc.

7. What are constraints in SQL Server? Name a few types.

Answer: Constraints enforce rules. Types: PRIMARY KEY, FOREIGN KEY, CHECK, UNIQUE, NOT NULL.

8. What is a primary key? Can a table have multiple primary keys?

Answer: A primary key uniquely identifies rows. A table can have only one primary key.

9. What is the difference between CHAR, VARCHAR, and NVARCHAR?

Answer: CHAR is fixed-length, VARCHAR is variable-length, NVARCHAR supports Unicode.

10. How can you check for NULL values in SQL?

Answer: Use IS NULL or IS NOT NULL.

11. What are indexes? What is the difference between clustered and non-clustered indexes?

Answer: Indexes speed up search. Clustered stores data rows, non-clustered stores pointers.

12. What is a stored procedure? How is it different from a function?

Answer: Stored procedure is a saved SQL block; functions return values and can be used in queries.

13. What are triggers? When would you use them?

Answer: Triggers run automatically on events. Use them for audit or auto-updates.

14. What is the WITH (NOLOCK) hint? What are its pros and cons?

Answer: It reads data without locking. Pro: faster. Con: may read uncommitted data.

15. How do transactions work in SQL Server? Explain ACID properties.

Answer: Transactions ensure data reliability. ACID: Atomicity, Consistency, Isolation, Durability.

16. How can you prevent SQL injection in SQL Server?

Answer: Use parameterized queries and stored procedures.

17. What is the difference between DELETE, TRUNCATE, and DROP?

Answer: DELETE removes rows, TRUNCATE removes all rows faster, DROP deletes table.

18. What is a view? Can you update data through a view?

Answer: A view is a virtual table. You can update it if it maps to one table.

19. How do you handle errors in T-SQL?

Answer: Use TRY...CATCH blocks.

20. What is a CTE (Common Table Expression)? When should it be used?

Answer: CTE is a temporary result set. Use it for better query structure or recursion.

21. What is the execution plan? How do you use it for performance tuning?

Answer: Execution plan shows how SQL Server runs a query. Use it to find bottlenecks.

22. What is indexing strategy for large datasets?

Answer: Use clustered index on primary key, non-clustered on search columns.

23. How would you optimize a slow-running query?

Answer: Check indexes, use execution plan, avoid SELECT *, limit joins.

24. What are SQL Server isolation levels? Explain each.

Answer: READ UNCOMMITTED, READ COMMITTED, REPEATABLE READ, SNAPSHOT, SERIALIZABLE.

25. What are temp tables vs table variables? When should you use each?

Answer: Temp tables are in tempdb and support indexes; table variables are in memory, used for small data.