SQL 350 Q&A - Part 1 (Q1–Q100)

## Q1. What is SQL?

SQL stands for Structured Query Language. It is used to talk to databases.

## Q2. What is the difference between SQL and MySQL?

SQL is a language. MySQL is a database system that uses SQL.

## Q3. What is DBMS?

Database Management System, software to manage databases.

## Q4. What is RDBMS?

Relational Database Management System, stores data in tables with rows and columns.

## Q5. What are SQL statements?

They are commands like DDL, DML, DCL, and TCL.

## Q6. What is a table?

A structure with rows (records) and columns (fields).

## Q7. What is a row?

A record in a table.

## Q8. What is a column?

A field in a table.

## Q9. What is a primary key?

A column that uniquely identifies each row and cannot be null.

## Q10. What is a foreign key?

A column that links one table to another using its primary key.

## Q11. What is a unique key?

A key that ensures values are unique but allows one null.

## Q12. What is NULL in SQL?

It means missing or unknown value.

## Q13. What does SELECT do?

It is used to get data from a table.

## Q14. What does DISTINCT do?

It removes duplicate rows.

## Q15. What does ORDER BY do?

It sorts results by one or more columns.

## Q16. What does WHERE do?

It filters rows based on a condition.

## Q17. What is the difference between AND and OR?

AND needs both true, OR needs at least one true.

## Q18. What does BETWEEN do?

It checks if a value is inside a range.

## Q19. What does IN do?

It checks if a value matches any value in a list.

## Q20. What does LIKE do?

It checks if text matches a pattern.

## Q21. What is % in LIKE?

% means zero or more characters.

## Q22. What is \_ in LIKE?

\_ means one character.

## Q23. How do you check NULL values?

Use IS NULL or IS NOT NULL.

## Q24. Difference between UNION and UNION ALL?

UNION removes duplicates, UNION ALL keeps them.

## Q25. What is INTERSECT?

It returns rows common to two queries.

## Q26. What is EXCEPT?

It returns rows in the first query but not in the second.

## Q27. What is CASE in SQL?

It adds conditional logic in queries.

## Q28. What is COALESCE?

It returns the first non-null value in a list.

## Q29. What is CAST in SQL?

It changes one data type to another.

## Q30. What is CONVERT in SQL?

It also changes data types, similar to CAST.

## Q31. What is a JOIN?

It combines rows from two tables based on a condition.

## Q32. What is INNER JOIN?

It returns only rows with matches in both tables.

## Q33. What is LEFT JOIN?

It returns all rows from left table, and matches from right.

## Q34. What is RIGHT JOIN?

It returns all rows from right table, and matches from left.

## Q35. What is FULL OUTER JOIN?

It returns all rows when there is a match in one table.

## Q36. What is CROSS JOIN?

It returns every combination of rows from two tables.

## Q37. What is SELF JOIN?

A table joined to itself.

## Q38. What is NATURAL JOIN?

It joins tables automatically by columns with same names.

## Q39. What is a Hash Join?

It uses hashing to join large tables quickly.

## Q40. What is a Merge Join?

It merges sorted tables to join them.

## Q41. What is a Semi Join?

It checks if rows in one table have matches in another, but only returns from one table.

## Q42. What is an Anti Join?

It returns rows from one table that do not have matches in another.

## Q43. What are aggregate functions?

They work on many rows like SUM, AVG, MIN, MAX.

## Q44. What are scalar functions?

They work on single rows like UPPER, LOWER.

## Q45. What does COUNT() do?

It counts rows.

## Q46. What does SUM() do?

It adds numbers together.

## Q47. What does AVG() do?

It calculates average.

## Q48. What does MIN() do?

It finds the smallest value.

## Q49. What does MAX() do?

It finds the biggest value.

## Q50. What does ROUND() do?

It rounds numbers to given decimal places.

## Q51. What does CEIL() do?

It rounds a number up to nearest integer.

## Q52. What does FLOOR() do?

It rounds a number down to nearest integer.

## Q53. What does ABS() do?

It gives absolute value.

## Q54. What does MOD() do?

It gives remainder of division.

## Q55. What does SUBSTR() do?

It gets part of a string.

## Q56. What does REPLACE() do?

It changes part of a string with something else.

## Q57. What are constraints in SQL?

Rules on columns like NOT NULL, UNIQUE, PRIMARY KEY.

## Q58. What does NOT NULL mean?

Column cannot have missing values.

## Q59. What does UNIQUE mean?

Column must have unique values.

## Q60. What does CHECK do?

It sets a condition values must meet.

## Q61. What does DEFAULT do?

It gives a column a default value if none is entered.

## Q62. What does ON DELETE CASCADE do?

Deletes child rows if parent is deleted.

## Q63. What does ON UPDATE CASCADE do?

Updates child rows if parent is updated.

## Q64. What is a composite key?

A key made from two or more columns.

## Q65. Can constraints be named?

Yes, you can give them names.

## Q66. Can constraints be disabled?

Yes, temporarily.

## Q67. Can constraints be dropped?

Yes, you can remove them.

## Q68. What is an index?

A structure that speeds up searches.

## Q69. What is a clustered index?

Stores rows in sorted order of the key.

## Q70. What is a non-clustered index?

Has pointers to rows instead of sorting data.

## Q71. What is a unique index?

Index that ensures values are unique.

## Q72. What is a bitmap index?

Index using bitmaps, good for few distinct values.

## Q73. What is a full-text index?

Helps search text inside columns.

## Q74. What is a covering index?

Contains all columns needed for a query.

## Q75. What are disadvantages of indexes?

They make writes slower because indexes must update.

## Q76. What is a transaction?

A group of SQL operations run together.

## Q77. What are ACID properties?

Atomicity, Consistency, Isolation, Durability.

## Q78. What does COMMIT do?

Saves all changes.

## Q79. What does ROLLBACK do?

Undoes changes since last commit.

## Q80. What does SAVEPOINT do?

Marks a point in transaction to roll back to.

## Q81. What is isolation level?

Rules on how/when changes are seen by others.

## Q82. What is Read Uncommitted?

Lowest level, allows dirty reads.

## Q83. What is Read Committed?

Default, avoids dirty reads.

## Q84. What is Repeatable Read?

Ensures same row shows same values in one transaction.

## Q85. What is Serializable?

Strictest, locks full range of rows.

## Q86. What is a deadlock?

Two transactions wait forever for each other.

## Q87. What is MVCC?

Multi-Version Concurrency Control, uses row versions.

## Q88. What is two-phase commit?

Commit process for multiple databases.

## Q89. What is a view?

A virtual table based on a query.

## Q90. What is a materialized view?

A view that stores data physically.

## Q91. What is WITH CHECK OPTION in views?

Restricts updates to rows that match view condition.

## Q92. What is indexed view?

A view with an index for faster access.

## Q93. How are views used for security?

They limit access to only some rows/columns.

## Q94. What is a stored procedure?

Saved SQL code that can be reused.

## Q95. What is a user-defined function?

A function created by user, returns value.

## Q96. What is scalar function?

Returns a single value.

## Q97. What is table-valued function?

Returns a table.

## Q98. What are procedure parameters?

Inputs and outputs like IN, OUT, INOUT.

## Q99. What is dynamic SQL?

SQL built as a string at runtime.

## Q100. How do you handle errors in procedures?

Use TRY and CATCH blocks.

SQL 350 Q&A - Part 2 (Q101–Q200)

## Q101. What is an index in SQL?

A structure to speed up searches on a table.

## Q102. What is a clustered index?

It sorts and stores rows in table order.

## Q103. What is a non-clustered index?

It has pointers to actual rows instead of sorting them.

## Q104. What is a unique index?

Index that ensures all values are unique.

## Q105. What is a composite index?

Index made of two or more columns.

## Q106. What is a bitmap index?

Index using bitmaps, good for few unique values.

## Q107. What is a full-text index?

Helps to search text inside large text columns.

## Q108. What is a covering index?

Index that has all needed columns for a query.

## Q109. What is the disadvantage of indexes?

They make writes slower because indexes must be updated.

## Q110. Can indexes be disabled?

Yes, some databases allow disabling and rebuilding indexes.

## Q111. What is a transaction?

A group of operations that run together as one unit.

## Q112. What are ACID properties?

Atomicity, Consistency, Isolation, Durability.

## Q113. What does COMMIT do?

It saves all changes of a transaction.

## Q114. What does ROLLBACK do?

It undoes all changes since last COMMIT.

## Q115. What does SAVEPOINT do?

It marks a point to rollback within a transaction.

## Q116. What is isolation level?

It decides how transactions are separated.

## Q117. What is Read Uncommitted?

Lowest level, allows dirty reads.

## Q118. What is Read Committed?

Default level, no dirty reads.

## Q119. What is Repeatable Read?

Prevents other changes during transaction.

## Q120. What is Serializable?

Strictest level, prevents phantom rows.

## Q121. What is a deadlock?

When two transactions wait for each other forever.

## Q122. How to prevent deadlock?

Access tables in same order, keep transactions short.

## Q123. What is MVCC?

Multi-Version Concurrency Control, uses row versions for concurrency.

## Q124. What is two-phase commit?

Process to commit across multiple databases.

## Q125. What is a view?

A virtual table based on query results.

## Q126. What is a materialized view?

A view that stores data physically for speed.

## Q127. What is WITH CHECK OPTION in views?

It prevents updates that don’t match view condition.

## Q128. What is an indexed view?

A view that has an index for faster access.

## Q129. How do views help security?

They limit access to certain columns or rows.

## Q130. What is a stored procedure?

Saved SQL code that can be reused.

## Q131. What are benefits of stored procedures?

Reusability, security, faster execution.

## Q132. What are procedure parameters?

IN, OUT, INOUT used for passing data.

## Q133. What is a user-defined function?

A function made by user to return a value.

## Q134. What is scalar function?

It returns a single value.

## Q135. What is table-valued function?

It returns a table of data.

## Q136. Difference between procedure and function?

Procedure can return many results, function returns one value or table.

## Q137. What is dynamic SQL?

SQL built as a string and run at runtime.

## Q138. What is sp\_executesql?

Command to run dynamic SQL in SQL Server.

## Q139. What is exception handling in SQL?

Using TRY and CATCH blocks.

## Q140. What is logging in SQL?

Saving actions in audit tables.

## Q141. What is a trigger?

Code that runs automatically on insert, update, or delete.

## Q142. What are types of triggers?

BEFORE, AFTER, INSTEAD OF.

## Q143. What is a row-level trigger?

Runs once for every row changed.

## Q144. What is a statement-level trigger?

Runs once for whole statement.

## Q145. What is an audit trigger?

Tracks who changed what data.

## Q146. What is a soft delete?

Mark row deleted instead of removing it.

## Q147. What is a scheduler in SQL?

A tool to run jobs automatically at set times.

## Q148. What is an event in SQL?

A scheduled task in database.

## Q149. What is a subquery?

A query inside another query.

## Q150. What is a correlated subquery?

It depends on outer query values.

## Q151. What is a CTE?

Common Table Expression using WITH clause.

## Q152. What are window functions?

Functions like ROW\_NUMBER, RANK, LAG, LEAD.

## Q153. What is ROW\_NUMBER?

Gives row numbers in order.

## Q154. What is RANK?

Gives rank with gaps for ties.

## Q155. What is DENSE\_RANK?

Gives rank without gaps for ties.

## Q156. What is LAG?

Gets value from previous row.

## Q157. What is LEAD?

Gets value from next row.

## Q158. What is pivot in SQL?

Turns rows into columns.

## Q159. What is unpivot in SQL?

Turns columns into rows.

## Q160. What is EXISTS in SQL?

Checks if subquery returns rows.

## Q161. What is NOT EXISTS in SQL?

Checks if subquery returns no rows.

## Q162. Difference between IN and EXISTS?

IN checks list, EXISTS checks subquery.

## Q163. What is a hierarchical query?

Query that handles parent-child relations.

## Q164. What are gaps and islands?

Pattern to find missing or continuous ranges.

## Q165. What is a recursive CTE?

A CTE that refers to itself for recursion.

## Q166. What is execution plan?

Shows how SQL will run query.

## Q167. How to view execution plan?

Use EXPLAIN or ANALYZE.

## Q168. What is a clustered scan?

Reading table rows in order of clustered index.

## Q169. What is a table scan?

Reading whole table without index.

## Q170. What is an index scan?

Reading data using index quickly.

## Q171. What is nested loop join?

Join method using outer loop for rows.

## Q172. What is hash join?

Join method using hashing.

## Q173. What is merge join?

Join method using sorted data.

## Q174. What is parameter sniffing?

When DB picks bad plan due to parameter value.

## Q175. What is denormalization?

Adding redundancy to improve speed.

## Q176. What is normalization?

Removing redundancy to keep consistency.

## Q177. What are forms of normalization?

1NF, 2NF, 3NF, BCNF.

## Q178. What is caching?

Storing results for faster use later.

## Q179. What is partitioning?

Splitting large table into smaller parts.

## Q180. Difference between partitioning and sharding?

Partitioning splits inside DB, sharding splits across DBs.

## Q181. What is replication?

Copying data to another database.

## Q182. What is log shipping?

Sending DB logs to standby server.

## Q183. What is backup in SQL?

A copy of database for recovery.

## Q184. What are backup types?

Full, differential, incremental.

## Q185. What is restore in SQL?

Bringing DB back from backup.

## Q186. What is failover?

Switching to standby server when main fails.

## Q187. What is switchover?

Planned role switch between main and standby.

## Q188. What is RPO?

Recovery Point Objective, max acceptable data loss.

## Q189. What is RTO?

Recovery Time Objective, time to restore system.

## Q190. What is high availability?

System designed to be up most of the time.

## Q191. What is disaster recovery?

Plan to restore DB after big failure.

## Q192. What is clustering?

Many servers work together for one DB.

## Q193. What is read replica?

Copy of DB used for read queries.

## Q194. What is split brain?

When two servers act as primary at once.

## Q195. What is runbook?

Step-by-step guide for fixing issues.

## Q196. What is data modeling?

Process of designing DB structure.

## Q197. What is ER diagram?

Shows entities and their relations.

## Q198. What is schema in SQL?

A collection of DB objects like tables and views.

## Q199. What is database sharding?

Splitting data across many DB servers.

## Q200. What is difference between replication and sharding?

Replication copies same data, sharding splits different data.

SQL 350 Q&A - Part 3 (Q201–Q275)

## Q201. What is a trigger?

Code that runs automatically on insert, update, or delete.

## Q202. What are BEFORE triggers?

They run before the main SQL action.

## Q203. What are AFTER triggers?

They run after the main SQL action.

## Q204. What are INSTEAD OF triggers?

They replace the main SQL action with custom logic.

## Q205. What is a row-level trigger?

Runs once for each row affected.

## Q206. What is a statement-level trigger?

Runs once for the whole SQL statement.

## Q207. What is an audit trigger?

Trigger that logs changes for auditing.

## Q208. What is a soft delete?

Mark a row as deleted without removing it.

## Q209. What is a hard delete?

Row is permanently removed from table.

## Q210. What is a scheduler in SQL?

Tool to run SQL jobs at set times.

## Q211. What is an event in SQL?

A scheduled job that runs automatically.

## Q212. What is a subquery?

A query inside another query.

## Q213. What is a correlated subquery?

Subquery that depends on outer query values.

## Q214. What is a CTE?

Common Table Expression using WITH clause.

## Q215. What is a recursive CTE?

A CTE that refers to itself to build hierarchy.

## Q216. What are window functions?

Functions like ROW\_NUMBER, RANK, LAG, LEAD.

## Q217. What is ROW\_NUMBER?

Gives row numbers based on order.

## Q218. What is RANK?

Gives rank with gaps for ties.

## Q219. What is DENSE\_RANK?

Gives rank without gaps for ties.

## Q220. What is LAG?

Gives value from previous row.

## Q221. What is LEAD?

Gives value from next row.

## Q222. What is NTILE?

Splits rows into number of groups.

## Q223. What is pivot in SQL?

Turns rows into columns.

## Q224. What is unpivot in SQL?

Turns columns into rows.

## Q225. Difference between EXISTS and IN?

EXISTS checks rows, IN checks list of values.

## Q226. What is NOT EXISTS?

Checks if subquery returns no rows.

## Q227. What is a hierarchical query?

Query that handles parent-child relations.

## Q228. What are gaps and islands?

Pattern to find missing or continuous ranges.

## Q229. What is execution plan?

It shows how SQL will run a query.

## Q230. How to see execution plan?

Use EXPLAIN or ANALYZE keyword.

## Q231. What is a table scan?

Reading all rows in table without index.

## Q232. What is an index scan?

Reading rows using index for speed.

## Q233. What is a clustered index scan?

Reading rows in clustered order.

## Q234. What is nested loop join?

Join method using outer loop for rows.

## Q235. What is hash join?

Join method using hash tables.

## Q236. What is merge join?

Join method using sorted data sets.

## Q237. What is parameter sniffing?

When DB uses a plan based on one parameter value.

## Q238. What is plan caching?

Storing execution plans for reuse.

## Q239. What is parameterized query?

Query with placeholders to reuse safely.

## Q240. What is denormalization?

Adding redundancy to speed up queries.

## Q241. What is normalization?

Organizing data to reduce redundancy.

## Q242. What is 1NF?

Each column has atomic values.

## Q243. What is 2NF?

No partial dependency on part of primary key.

## Q244. What is 3NF?

No transitive dependency on non-key columns.

## Q245. What is BCNF?

Every determinant is a candidate key.

## Q246. What is 4NF?

Removes multi-valued dependencies.

## Q247. What is 5NF?

Removes join dependencies.

## Q248. What is ER diagram?

Diagram showing entities and relations.

## Q249. What is schema?

A collection of database objects like tables and views.

## Q250. What is partitioning?

Splitting table into smaller parts for performance.

## Q251. What is sharding?

Splitting data across multiple databases.

## Q252. Difference between sharding and partitioning?

Sharding splits across DBs, partitioning inside DB.

## Q253. What is replication?

Copying data to another database for backup or speed.

## Q254. What is mirroring?

Real-time copy of DB for failover.

## Q255. What is log shipping?

Sending transaction logs to standby server.

## Q256. What is backup in SQL?

A saved copy of database.

## Q257. What are backup types?

Full, incremental, differential.

## Q258. What is restore in SQL?

Recovering DB from backup.

## Q259. What is recovery model?

Defines how transactions are logged.

## Q260. What is simple recovery model?

Logs minimal info, cannot restore to a point in time.

## Q261. What is full recovery model?

Logs everything, allows full recovery.

## Q262. What is bulk-logged recovery model?

Logs minimal info for bulk operations.

## Q263. What is failover?

Switch to standby server when main fails.

## Q264. What is switchover?

Planned change between primary and standby.

## Q265. What is high availability?

System designed to work most of the time without fail.

## Q266. What is disaster recovery?

Plan to restore database after failure.

## Q267. What is RPO?

Recovery Point Objective, max acceptable data loss.

## Q268. What is RTO?

Recovery Time Objective, time to restore service.

## Q269. What is clustering?

Many servers work together as one DB.

## Q270. What is load balancing?

Spreading workload across servers.

## Q271. What is read replica?

A copy of DB used for read-only queries.

## Q272. What is multi-master replication?

Multiple servers accept writes at same time.

## Q273. What is split-brain problem?

Two servers act as primary at once.

## Q274. What is quorum in clustering?

Minimum votes needed to keep system running.

## Q275. What is runbook?

Step-by-step guide to handle issues or failures.

SQL 350 Q&A - Part 4 (Q276–Q350)

## Q276. What is data modeling?

Process of designing database structure.

## Q277. What is normalization?

Organizing data to reduce redundancy.

## Q278. What is denormalization?

Adding redundancy to improve speed.

## Q279. What is 1NF?

Each column has atomic (single) values.

## Q280. What is 2NF?

No partial dependency on part of primary key.

## Q281. What is 3NF?

No transitive dependency on non-key columns.

## Q282. What is BCNF?

Every determinant must be a candidate key.

## Q283. What is 4NF?

Removes multi-valued dependencies.

## Q284. What is 5NF?

Removes join dependencies.

## Q285. What is ER diagram?

A visual diagram showing entities and relations.

## Q286. What is schema?

A collection of objects like tables and views.

## Q287. What is table partitioning?

Splitting table into smaller pieces for performance.

## Q288. What is horizontal partitioning?

Splitting rows into different tables.

## Q289. What is vertical partitioning?

Splitting columns into different tables.

## Q290. What is sharding?

Splitting data across multiple databases.

## Q291. Difference between sharding and partitioning?

Sharding across DBs, partitioning inside one DB.

## Q292. What is replication?

Copying data to another database.

## Q293. What is master-slave replication?

One server writes, others copy reads.

## Q294. What is multi-master replication?

Many servers allow writes at same time.

## Q295. What is snapshot replication?

Data is copied at one point in time.

## Q296. What is log shipping?

Transaction logs sent to standby server.

## Q297. What is mirroring?

Real-time copy of database to standby server.

## Q298. What is clustering?

Many servers act together for high availability.

## Q299. What is load balancing?

Distributing workload across servers.

## Q300. What is high availability?

System designed to stay available most of the time.

## Q301. What is disaster recovery?

Plan to restore system after big failure.

## Q302. What is RPO?

Recovery Point Objective, max acceptable data loss.

## Q303. What is RTO?

Recovery Time Objective, time to restore system.

## Q304. What is backup?

A saved copy of database for safety.

## Q305. Types of backup?

Full, incremental, differential.

## Q306. What is restore?

Recovering database from backup.

## Q307. What is transaction log backup?

Backup of log file for recovery.

## Q308. What is hot backup?

Backup while database is online.

## Q309. What is cold backup?

Backup when database is offline.

## Q310. What is point-in-time recovery?

Restoring DB to a specific moment.

## Q311. What is a DBA?

Database Administrator who manages DBs.

## Q312. What is role of DBA?

Backups, security, performance, maintenance.

## Q313. What is user in SQL?

An account allowed to access database.

## Q314. What is role in SQL?

A group of permissions given to users.

## Q315. Difference between GRANT and REVOKE?

GRANT gives permissions, REVOKE removes them.

## Q316. What is row-level security?

Restricting data access row by row.

## Q317. What is column-level security?

Restricting access to specific columns.

## Q318. What is encryption in SQL?

Converting data into unreadable format for safety.

## Q319. What is transparent data encryption (TDE)?

Encrypts entire database automatically.

## Q320. What is auditing in SQL?

Tracking who did what in the database.

## Q321. What is performance tuning?

Improving speed of database queries.

## Q322. What is indexing?

Adding structures for faster queries.

## Q323. What is over-indexing?

Too many indexes, slows down writes.

## Q324. What is query optimization?

Improving query logic for speed.

## Q325. What is execution plan?

Steps DB takes to run a query.

## Q326. What is EXPLAIN command?

Shows query execution plan.

## Q327. What is ANALYZE command?

Updates DB statistics for query planner.

## Q328. What is statistics in DB?

Metadata that helps optimizer pick best plan.

## Q329. What is table scan?

DB reads all rows of table.

## Q330. What is index scan?

DB uses index to fetch rows quickly.

## Q331. What is nested loop join?

Join method with outer loop on rows.

## Q332. What is hash join?

Join method using hash tables.

## Q333. What is merge join?

Join method using sorted data sets.

## Q334. What is partition pruning?

Skipping partitions not needed in query.

## Q335. What is query caching?

Storing query results for reuse.

## Q336. What is database caching?

General caching of frequently used data.

## Q337. What is connection pooling?

Reusing open connections for speed.

## Q338. What is ORM?

Object Relational Mapping, connects code to DB.

## Q339. Examples of ORM?

Hibernate, Sequelize, Entity Framework.

## Q340. What is SQL injection?

A hack by inserting malicious SQL into queries.

## Q341. How to prevent SQL injection?

Use parameterized queries and validations.

## Q342. What is prepared statement?

SQL query with placeholders to prevent injection.

## Q343. What is stored XSS via SQL?

When database holds unsafe scripts.

## Q344. What is database sandboxing?

Isolating DB for safe testing.

## Q345. What is time zone handling?

Storing time in UTC to avoid confusion.

## Q346. What are sequences in SQL?

Objects that generate unique numbers.

## Q347. What is identity column?

Auto-incrementing column for unique keys.

## Q348. Difference between sequence and identity?

Sequence is separate object, identity is part of table.

## Q349. What is soft delete?

Mark row deleted but keep data.

## Q350. What is hard delete?

Row is permanently removed from table.