SQL - Interview Questions:

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Structured Query Language (SQL):

1)Define Database?

A) Databases are used for storing, maintaining and accessing any sort of data. They collect information on people, places or things. That information is gathered in one place so that it can be observed and analyzed. Databases can be thought of as an organized collection of information.

2)What are the different types of Databases?

A) There are 4 types of databases and are as follows:

1.Relational databases

2.Hierarchical databases

3.Network databases

4.Object-oriented databases

3) What is SQL?

A) Standard Query Language (SQL) is a standard language for Relational Database Management Systems and is useful in handling organized data that has entities or variables with relations between them.

4) What are Joins in SQL?

A) Joins in SQL are used to combine rows from two or more tables based on a related column between them. There are various types of Joins that can be used to retrieve data, and it depends on the relationship between tables.

There are four types of Joins:

- Inner Join
- Left Join
- Right Join
- Full Join

5) What are the subsets of SQL?

A) SQL queries are divided into four main categories:

1. Data Definition Language(DDL): These are used to define and modify the database structure.
   Examples: Create, Drop, Alter, Truncate etc.
2. Data Manipulation Language (DML) : In order to manipulate data in a database we use DML queries.
   Examples: Select Into, Update, Insert, Delete etc.
3. Data Control Language (DCL): These queries manage the access rights and permission control of the database.
   Examples: Grant, Revoke.
4. Transaction Control Language (TCL): TCL queries manages the transactions in a database and the changes made by the DML statements.
   Example: Commit, Rollback, Savepoint, Set Transaction.

6) SQL CREATE DATABASE is used to,

A. Create a table, B. Create a row, C. Create a column, D. Create a database

Answer: D) Create a database

7) Which statement is used to select the database in SQL?

A. Update database, B. Select database, C. Alter, D. Use

Answer: D) Use

8) What do you mean by DBMS? What are its different types?

A) A Database Management System(DBMS) is a software application that allows a user to interact with the database. The data stored in the database can be modified, retrieved and deleted and can be of any type like strings, numbers, images, etc.

Two Types of DBMS:

Relational Database Management System	The data stored in relations(tables). Ex: MySQL
Non-Relational Database Management System	No concept of relations. Ex: MongoDB

9) Write a query to fetch all the columns from the table employees? @KEDAM MAHESH BABU

A) Select * from employees;

10) Write an SQL Query to find an employee whose age is equal or greater than 30?

A) select emp_name from employees where age>=30;

11) What is RDBMS?

A) RDBMS stores data in the form of a collection of tables.The relations are defined between the common fields of these tables. MS SQL Server, MySQL, IBM DB2 and Oracle are all based on RDBMS.

12) Write an SQL query to find the second highest salary of an employee?

A) select max(salary) from employee where salary not in (select max(salary) from employee);

13) What are the types of joins in SQL?

Inner Join	selects records that have matching values in both tables.	Select column_name(s)From table1 Inner Join table2 ON table1.column_name = table2.column_name;
Left Join	It returns all records from the left table (table1), and the matching records from the right table (table2). The result is 0 records from the right side, if there is no match.	Select column_name(s)From table1 Left Join table2 ON table1.column_name = table2.column_name;
Right Join	It returns all records from the right table (table2), and the matching records from the left	Select column_name(s)From table1 Right Join table2 ON

	table (table1). The result is 0 records from the left side, if there is no match.	table1.column_name = table2.column_name;
Full Join	It returns all records when there is a match in left (table1) or right (table2) table records.	Select column_name(s)From table1 Full Outer Join table2 ON table1.column_name = table2.column_name;
Self Join	A self join is a regular join, but the table is joined with itself.	Select column_name(s) from table1 T1, table1 T2 where condition;

14) Which of the below queries is used to select all records from emp where job not in SALESMAN or CLERK?

A) select * from emp where job not in ('SALESMAN','CLERK');

B)select * from emp where job not in 'SALESMAN' or 'CLERK';

C)select ALL from emp where job in ('SALESMAN','CLERK');

D)select * from emp where job not in ('SALESMAN' or 'CLERK');

Answer : A

15)Write an SQL Query to find the number of employees according to gender whose DOB is between 01/01/1960 to 31/12/1975?

A) select count(*), sex from employees where DOB between 01/01/1960 ' AND '31/12/1975' GROUP BY sex;

16) What is the difference between Having and Where clauses?

WHERE Clause is used to filter the records from the table based on the specified condition.	HAVING Clause is used to filter records from the groups based on the specified condition.
WHERE Clause can be used with SELECT, UPDATE, DELETE statement.	HAVING Clause can only be used with a SELECT statement.
WHERE Clause cannot contain aggregate function	HAVING Clause can contain aggregate function
WHERE Clause implements in row operations	HAVING Clause implements in column operation
WHERE Clause is used with single row functions like UPPER, LOWER.	HAVING Clause is used with multiple row functions like SUM, COUNT.

17)What is the difference between SQL and MySQL? @KEDAM MAHESH BABU

SQL	MYSQL
Structured Query Language is used to interact with a database.	MySQL is a database management system.
It is used for writing queries and operating database systems.	It allows data handling, storing, and modifying in an organized manner.
It supports only a single storage engine.	It supports multiple storage engines.
The server is independent.	During backup sessions, the server blocks the database.

18) What is the difference between Unique key, Primary key and Foreign key?

Unique key	Primary key	Foreign key

UNIQUE Key constraint ensures values are unique in a column or set of columns.	Primary Key constraint too ensures values are unique in a column or set of columns.	A FOREIGN KEY is a field (or collection of fields) in one table, that refers to the PRIMARY KEY in another table.
Unique Constraint may have a NULL value.	Primary key cannot have a NULL value.	Foreign key can accept multiple null values.
Each table can have more than one Unique Constraint.	Each table can have only one primary key.	We can have more than one foreign key in a table.

19) Write a SQL query to get the third-highest salary of an employee from employee_table?

A) select salary from(select salary from employee_table order by salary DESC limit 3) as emp order by salary ASC limit 1;

20) What is a data warehouse?

A) A data warehouse is a large store of accumulated data, from a wide range of sources, within an organization. The data helps drive business decisions.

21) What is an Auto Increment?

A)Auto-increment generates a unique number automatically when a new record is inserted into a table.

Ex: create table Persons (

Personid int not null AUTO_INCREMENT,

LastName varchar(255 not null,

Primary key (Personid));

22) Why do we need a Stored Procedure in SQL?

A) An SQL query that needs to be written over and over again can be saved as a stored procedure and then just call it to execute it.

Syntax: Create procedure procedure_name as sql_statement

Go;

23) How can we fetch all records without duplicates from two tables emp1 and emp2 which have a common record?

A) (select * from emp1)union(select * from emp2);

24) select all records where ename starts with 'S' and its length is 6 char?

A) select * from employees where ename like 's__';

25) What are the types of SQL Operators? @KEDAM MAHESH BABU

A) Operators are the special keywords or characters that perform specific operations in sql queries.

Arithmetic Operators	+,-,*,%./
Logical Operators	All, And,Any,Exists,Between,IN etc
Comparison Operators	=,<,>,>=,<= etc

Bitwise Operators	AND,OR,NOT
Compound Operators	(+=),(-=),(*=),(/=),(%=)
String Operators	+ (String concatenation),% (Wildcard),+= (String concatenation assignment)

26) Difference between correlated and uncorrelated subqueries in SQL?

A) Correlated subquery- Outer query needs to be executed before inner query as inner query is dependent on the outer query.

Non-Correlated subquery- In non-correlated query the inner query does not depend on the outer query. They both can run separately.

EmployeeInfo Table:

EmpID	EmpFname	EmpLname	Department	Project	Address	DOB	Gender
1	Sanjay	Mehra	HR	P1	Hyderabad(HYD)	01/12/1976	M
2	Ananya	Mishra	Admin	P2	Delhi(DEL)	02/05/1968	F
3	Rohan	Diwan	Account	P3	Mumbai(BOM)	01/01/1980	M
4	Sonia	Kulkarni	HR	P1	Hyderabad(HYD)	02/05/1992	F
5	Ankit	Kapoor	Admin	P2	Delhi(DEL)	03/07/1994	M

EmployeePosition Table:

EmpID	EmpPosition	DateOfJoining	Salary
1	Manager	01/05/2022	500000
2	Executive	02/05/2022	75000
3	Manager	01/05/2022	90000
2	Lead	02/05/2022	85000
1	Executive	01/05/2022	300000

27). Write a query to fetch the Empname from the EmployeeInfo table in upper case and use the ALIAS name as EmpName.

```
SELECT UPPER(EmpFname) AS EmpName FROM EmployeeInfo;
```

28). Write a query to fetch the number of employees working in the department 'HR'.

```
SELECT COUNT(*) FROM EmployeeInfo WHERE Department = 'HR';
```

29). Write a query to get the current date.

You can write a query as follows in SQL Server:

```
SELECT GETDATE();
```

30). Write a query to retrieve the first four characters of EmpLname from the EmployeeInfo table.

```
SELECT SUBSTRING(EmpLname, 1, 4) FROM EmployeeInfo;
```

31). Write a query to fetch only the place name(string before brackets) from the Address column of EmployeeInfo table.

Using the MID function in MySQL

```
SELECT MID(Address, 0, LOCATE('(',Address)) FROM EmployeeInfo;
```

Using SUBSTRING

```
SELECT SUBSTRING(Address, 1, CHARINDEX('(',Address)) FROM EmployeeInfo;
```

32). Write a query to create a new table which consists of data and structure copied from the other table.

Using the SELECT INTO command:

```
SELECT * INTO NewTable FROM EmployeeInfo WHERE 1 = 0;
```

33). Write a query to find all the employees whose salary is between 50000 to 100000.

```
SELECT * FROM EmployeePosition WHERE Salary BETWEEN '50000' AND '100000';
```

34). Write a query to find the names of employees that begin with 'S'

```
SELECT * FROM EmployeeInfo WHERE EmpFname LIKE 'S%';
```

35). Write a query to fetch top N records.

By using the TOP command in SQL Server:

```
SELECT TOP N * FROM EmployeePosition ORDER BY Salary DESC;
```

By using the LIMIT command in MySQL:

```
SELECT * FROM EmpPosition ORDER BY Salary DESC LIMIT N;
```

36). Write a query to retrieve the EmpFname and EmpLname in a single column as "FullName".

The first name and the last name must be separated with space.

```
SELECT CONCAT(EmpFname, ' ', EmpLname) AS 'FullName' FROM EmployeeInfo;
```

37). Write a query find number of employees whose DOB is between 02/05/1970 to 31/12/1975 and are grouped according to gender

```
SELECT COUNT(*), Gender FROM EmployeeInfo WHERE DOB BETWEEN '02/05/1970 ' AND '31
```

38). Write a query to fetch all the records from the EmployeeInfo table ordered by EmpLname in descending order and Department in the ascending order.

```
SELECT * FROM EmployeeInfo ORDER BY EmpFname desc, Department asc;
```

39). Write a query to fetch details of employees whose EmpLname ends with an alphabet 'A' and contains five alphabets.

```
SELECT * FROM EmployeeInfo WHERE EmpLname LIKE '____a';
```

40). Write a query to fetch details of all employees excluding the employees with first names, "Sanjay" and "Sonia" from the EmployeeInfo table. @KEDAM MAHESH BABU

```
SELECT * FROM EmployeeInfo WHERE EmpFname NOT IN ('Sanjay','Sonia');
```

41). Write a query to fetch details of employees with the address as “DELHI(DEL)”.

```
SELECT * FROM EmployeeInfo WHERE Address LIKE 'DELHI(DEL)%';
```

42). Write a query to fetch all employees who also hold the managerial position.

```
SELECT E.EmpFname, E.EmpLname, P.EmpPosition
FROM EmployeeInfo E INNER JOIN EmployeePosition P ON
E.EmpID = P.EmpID AND P.EmpPosition IN ('Manager');
```

43). Write a query to fetch the department-wise count of employees sorted by department’s count in ascending order.

```
SELECT Department, count(EmpID) AS EmpDeptCount
FROM EmployeeInfo GROUP BY Department
ORDER BY EmpDeptCount ASC;
```

44). Write a query to calculate the even and odd records from a table.

To retrieve the even records from a table, you have to use the MOD() function as follows:

```
SELECT EmpID FROM (SELECT rowno, EmpID from EmployeeInfo) WHERE MOD(rowno,2)=0;
```

Similarly, to retrieve the odd records from a table, you can write a query as follows:

```
SELECT EmpID FROM (SELECT rowno, EmpID from EmployeeInfo) WHERE MOD(rowno,2)=1;
```

45). Write a SQL query to retrieve employee details from EmployeeInfo table who have a date of joining in the EmployeePosition table.

```
SELECT * FROM EmployeeInfo E
WHERE EXISTS
(SELECT * FROM EmployeePosition P WHERE E.EmpId = P.EmpId);
```

46). Write a query to retrieve two minimum and maximum salaries from the EmployeePosition table.

- To retrieve two minimum salaries, you can write a query as below:

```
SELECT DISTINCT Salary FROM EmployeePosition E1
WHERE 2 >= (SELECT COUNT(DISTINCT Salary)FROM EmployeePosition E2
  WHERE E1.Salary >= E2.Salary) ORDER BY E1.Salary DESC;
```

- To retrieve two maximum salaries, you can write a query as below:

```
SELECT DISTINCT Salary FROM EmployeePosition E1
WHERE 2 >= (SELECT COUNT(DISTINCT Salary) FROM EmployeePosition E2
  WHERE E1.Salary <= E2.Salary) ORDER BY E1.Salary DESC;
```

47). Write a query to find the Nth highest salary from the table without using TOP/limit keyword.

```
SELECT Salary
FROM EmployeePosition E1
WHERE N-1 = (
  SELECT COUNT( DISTINCT ( E2.Salary ) )
  FROM EmployeePosition E2
  WHERE E2.Salary >  E1.Salary );
```

48). Write a query to retrieve duplicate records from a table.

```
SELECT EmpID, EmpFname, Department COUNT(*)
FROM EmployeeInfo GROUP BY EmpID, EmpFname, Department
HAVING COUNT(*) > 1;
```

49). Write a query to retrieve the list of employees working in the same department.

```
Select DISTINCT E.EmpID, E.EmpFname, E.Department
FROM EmployeeInfo E, Employee E1
WHERE E.Department = E1.Department AND E.EmpID != E1.EmpID;
```

50). Write a query to retrieve the last 3 records from the EmployeeInfo table.

```
SELECT * FROM EmployeeInfo WHERE
EmpID <=3 UNION SELECT * FROM
(SELECT * FROM EmployeeInfo E ORDER BY E.EmpID DESC)
AS E1 WHERE E1.EmpID <=3;
```

51). Write a query to find the third-highest salary from the EmpPosition table.

```
SELECT TOP 1 salary
FROM(
SELECT TOP 3 salary
FROM employee_table
ORDER BY salary DESC) AS emp
ORDER BY salary ASC;
```


52). Write a query to display the first and the last record from the EmployeeInfo table.

To display the first record from the EmployeeInfo table, you can write a query as follows:

```
SELECT * FROM EmployeeInfo WHERE EmpID = (SELECT MIN(EmpID) FROM EmployeeInfo);
```

To display the last record from the EmployeeInfo table, you can write a query as follows:

```
SELECT * FROM EmployeeInfo WHERE EmpID = (SELECT MAX(EmpID) FROM EmployeeInfo);
```

53). Write a query to add email validation to your database

SELECT Email FROM EmployeeInfo WHERE NOT REGEXP_LIKE(Email, '[A-Z0-9._%+-]+@[A-Z0-9.-]+.[A-Z]{2,4}', 'i');

54). Write a query to retrieve Departments who have less than 2 employees working in it.

SELECT DEPARTMENT, COUNT(EmpID) as 'EmpNo' FROM EmployeeInfo GROUP BY DEPARTMENT HAVING COUNT(EmpD) < 2;

55). Write a query to retrieve EmpPostion along with total salaries paid for each of them.

SELECT EmpPosition, SUM(Salary) from EmployeePosition GROUP BY EmpPosition;

56). Write a query to fetch 50% records from the EmployeeInfo table.

SELECT * FROM EmployeeInfo WHERE

EmpID <= (SELECT COUNT(EmpID)/2 from EmployeeInfo);

57).What is Dynamic SQL, and when can you use it?

Ans:Dynamic SQL is the programming method that allows building SQL statements during runtime. You can use dynamic SQL when you do not know the full text of the SQL statements used in the program until runtime. Moreover, dynamic SQL can execute SQL statements that are not supported by static SQL programs. So, Dynamic SQL helps to build more flexible applications.

58).Explain the difference between the Drop,Truncate,Delete

Ans:TRUNCATE Command is a Data Definition Language operation. It is used to remove all the records from a table. It deletes all the records from an existing table but not the table itself. The structure or schema of the table is preserved.

*TRUNCATE TABLE statement is a DDL command so it can not be rolled back.

The DELETE statement in SQL is a Data Manipulation Language(DML) Command. It is used to delete existing records from an existing table. We can delete a single record or multiple records depending on the condition specified in the query.The DELETE statement scans every row before deleting it. Thus it is slower as compared to the TRUNCATE command. If we want to delete all the records of a table, it is preferable to use TRUNCATE in place of DELETE as the former is faster than the latter.

*DELETE is a DML Command so it can be rolled back.

DROP statement is a Data Definition Language(DDL) Command which is used to delete existing database objects. It can be used to delete databases, tables, views, triggers, etc.

A DROP statement in SQL removes a component from a relational database management system (RDBMS).

*DROP is a DDL Command. Objects deleted using DROP are permanently lost and it cannot be rolled back.

59) Write a Query to display the number of employees working in each region?

Ans:SELECT region, COUNT(gender) FROM employee GROUP BY region;

60) What is a trigger in SQL? @KEDAM MAHESH BABU

Ans:A trigger is a stored program in a database which automatically gives responses to an event of DML operations done by inserting, update, or delete. In other words, is nothing but an auditor of events happening across all database tables.

61)How can you create an empty table from an existing table?

Ans:Select * into studentcopy from student where 1=2

*Here, we are copying the student table to another table with the same structure with no rows copied.

62). What is the difference between CHAR and VARCHAR2 datatypes in SQL?

Ans:Both Char and Varchar2 are used for characters datatype but varchar2 is used for character strings of variable length whereas Char is used for strings of fixed length. For example, char(10) can only store 10 characters and will not be able to store a string of any other length whereas varchar2(10) can store any length i.e 6,8,2 in this variable.

63). What does BLOB in SQL stand for?

A.Binary Large Objects, B.Big Large Objects, C.Binary Language for Objects, D.None of the above

Ans:A

64).Which of the following datatype is most appropriate for storing a string of up to 255 characters?

A. Text, B. Tiny text, C.BLOB, D.BINARY

Ans:B(TINY TEXT can contain a string of up to 255 characters or 255 bytes.)

65) .Explain difference between Grant and Revoke Functions

Ans:GRANT & REVOKE are the popular members of the SQL family. These are the types of DCL commands that are used to assign permission to the users to perform a different task. The GRANT command is used for permitting the users whereas the REVOKE command is used for removing the authorization.

66).NATURAL JOIN can also be termed as -

A.Combination of Union and cartesian product

B.Combination of Selection and cartesian product

C.Combination of Projection and cartesian product

D.None of the above

Ans:C(NATURAL JOIN can also be termed as a combination of Projection and cartesian product.)

67).What is a self referencing foreign key? Give an example.

Ans:

A foreign key which is stored in a table itself is called a self referencing foreign key.

For example consider an Employee database table. It has employee_id as primary key as well as a manager_id which is employee_id of his manager. If we create a foreign key constraint, as a manager is also an employee, manager_id will reference to empolyee_id in the same table. The Employee table with self referencing foreign key manager_id can be created using the below statement.

```
CREATE TABLE `Employee`(

`name` VARCHAR(25) NOT NULL,

`employee_id` CHAR(9) NOT NULL,

`manager_id` CHAR(9) NOT NULL,

`salary` decimal(10,2) NULL,

PRIMARY KEY(`employee_id`),

FOREIGN KEY (manager_id) REFERENCES employee(employee_id) ON DELETE CASCADE);
```

68) What is the difference between the primary key and the candidate key?

Ans: The primary key in MySQL is used to identify every row of a table in a unique manner. For one table, there is only one primary key. The candidate keys can be used to reference the foreign keys. One of the candidate keys is the primary key.

69).How can we add a new column to the existing table?

Ans: The ALTER TABLE statement is used to add, delete, or modify columns in an existing table.The ALTER TABLE statement is also used to add and drop various constraints on an existing table.

Ex:ALTER TABLE Customers

ADD Email varchar(255);

70).What is De-normalization?

Ans:De-normalization is the process of optimizing the read performance of a database by adding redundant data or by grouping data. De-normalization is used in OLAP systems.

71).Explain Transaction?

Ans:A transaction is a logical unit of work performed against a database in which all steps must be performed or none.

72) Describe the Difference Between Window Functions and Aggregate Functions.

The main difference between window functions and aggregate functions is that aggregate functions group multiple rows into a single result row; all the individual rows in the group are collapsed and their individual data is not shown. On the other hand, window functions produce a result for each individual row. This result is usually shown as a new column value in every row within the window.

73).Write a Query to fetch the first record from the Employee table?

Ans:

Select * from Employee where Rownum =1;

(ROWNUM is nothing but logical sequence number given to the rows fetched from the table.)

Select * from Employee where Rowid= select min(Rowid) from Employee;

(ROWID is nothing but the physical memory location on which that data/row is stored.ROWID basically returns the address of the row.) @KEDAM MAHESH BABU

74)._____ is a collection of data that is used in volume, yet growing exponentially with time

A.Big Database, B.Big DBMS, C.Big Datafile, D.Big Data

Ans:D

75).What is the main difference between SQL and PL/SQL?

Ans:SQL is a query language that allows you to issue a single query or execute a single insert/update/delete whereas PL/SQL is Oracle's "Procedural Language" SQL, which allows you to write a full program (loops, variables, etc.) to accomplish multiple operations such as selects/inserts/updates/deletes.

76).Name the operator which is used in the query for pattern matching?

Ans: LIKE operator is used for pattern matching,

5. % – It matches zero or more characters.

For example- select * from students where studentname like 'a%'

_ (Underscore) – it matches exactly one character.

For example- select * from student where studentname like 'abc_'

77).Explain recursive stored procedure?

Ans: Recursive stored procedure refers to a stored procedure which calls by itself until it reaches some boundary condition. This recursive function or procedure helps the programmers to use the same set of code n number of times.

78).What is the main difference between 'BETWEEN' and 'IN' condition operators?

Ans: BETWEEN operator is used to display rows based on a range of values in a row whereas the IN condition operator is used to check for values contained in a specific set of values.

Example of BETWEEN:
SELECT * FROM Students where ROLL_NO BETWEEN 10 AND 50;

Example of IN:

SELECT * FROM students where ROLL_NO IN (8,15,25);

79) NULL values same as that of zero or a blank space?

A.true

B.false

Ans:B

(A NULL value is not at all same as that of zero or a blank space. NULL value represents a value which is unavailable, unknown, assigned or not applicable whereas a zero is a number and blank space is a character.)

80) What is the difference between the RANK() and DENSE_RANK() functions?

The RANK() function in the result set defines the rank of each row within your ordered partition. If both rows have the same rank, the next number in the ranking will be the previous rank plus a number of duplicates. If we have three records at rank 4, for example, the next level indicated is 7.

The DENSE_RANK() function assigns a distinct rank to each row within a partition based on the provided column value, with no gaps. It always indicates a ranking in order of precedence. This function will assign the same rank to the two rows if they have the same rank, with the next rank being the next consecutive number. If we have three records at rank 4, for example, the next level indicated is 5.

81).What is a hash join in SQL?

Ans: Just like any other join, the hash join requires two inputs, which are the probe input (inner table) and the build input (outer table). A hash join involves the use of a hash table to identify rows matching between two tables. The hash join is the option when no other join is preferred (possibly due to the absence of sorting or indexing etc). Hash joins are best when joining large data sets that are unsorted and non-indexed.

82) Wildcard characters are used with the _____ operator

a) LIKE

b) IN

c) BETWEEN

d) HAVING

Ans: a) LIKE

Wildcard characters are used with the LIKE operator to search for a specific pattern in a column.

83).Which operator is used to compare the NULL values in SQL?

a) Equal

b) IN

c) IS

d) None of Above

Answer: c) IS

84) What happens to null value with EXISTS using subquery?

Ans: If sub query returns null value, exists return true,

Exists statement resolves null value with True.