# Verbally asked SQL Questions

1. Explain order of execution of SQL.

**FROM>WHERE>GROUP BY>HAVING>SELECT>ORDER BY>LIMIT**

| ORDER | CLAUSE | FUNCTION |
|---|---|---|
| 1 | from | Choose and join tables to get base data. |
| 2 | Where | Filters the base data. |
| 3 | Group by | Aggregate the base data. |
| 4 | Having | Filter the aggregate data. |
| 5 | Select | Returns the final data. |
| 6 | Order by | Sort the final data. |
| 7 | limit | Limit the returned data to a row count. |

**FROM>WHERE>GROUP BY>HAVING>SELECT>ORDER BY>LIMIT**

**Example:-**

```
SELECT Dept, AVG (Salary) AS avg_salary
FROM employee
WHERE Joined>1995-05-15
GROUP BY Dept
HAVING COUNT (*)>1
ORDER BY avg_salary DESC
LIMIT 3;
```

```
+---------+-------------+
| Dept    | avg_salary  |
+---------+-------------+
| Account | 619500.0000 |
| Tester  | 600000.0000 |
| HR      | 425000.0000 |
+---------+-------------+
3 rows in set, 1 warning (0.00 sec)
```

## 2. Difference between WHERE and HAVING Clause?

- WHERE clause cannot be used with aggregate functions whereas HAVING can. This means WHERE clause is used for filtering individual rows where as HAVING clause is used to filter group.

- WHERE clause comes before GROUP BY clause.
  This means WHERE clause filters rows before aggregate calculations are performed.
  HAVING clause comes after GROUP BY. This means HAVING clause filters rows after aggregate calculations are performed.
  So from performance point of view, HAVING is slower than WHERE and should be avoided when possible.

- WHERE and HAVING can be used together in a SELECT query. In this case WHERE clause is applied first to filter individual rows. The rows are then grouped and aggregate calculations are performed, and then the HAVING clause filters the group.

- So from a performance standpoint, HAVING clause is slower than WHERE and should be avoided when possible.

- Another difference is WHERE clause comes before GROUP BY and HAVING clause comes after GROUP BY clause.

## 3. What is the use of GROUP BY Clause?

- The GROUP BY Clause is used to collect data from multiple records and group the result by one or more column. It is generally used in a SELECT statement.
- You can also use some aggregate functions like COUNT, SUM, MIN, MAX, AVG etc. on the grouped column.

## Features

- GROUP BY clause is used with the SELECT statement.
- In the query, the GROUP BY clause is placed after the WHERE clause.
- In the query, the GROUP BY clause is placed before the ORDER BY clause if used.
- In the query, the Group BY clause is placed before the Having clause.

## Syntax:-

SELECT column1, function_name(column2)

FROM table_name

WHERE condition

GROUP BY column1, column2

ORDER BY column1, column2;

## Example:-

1. SELECT Name, SUM (Salary) FROM employee GROUP BY Name;

2. SELECT Subject, Year, Count (*) FROM Student GROUP BY Subject, Year;

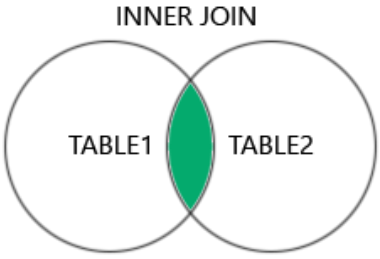
**4. Explain all types of joins in SQL?**

JOIN clause combines rows of a data in different tables with a shared column.

There are four types of JOINS in SQL: -

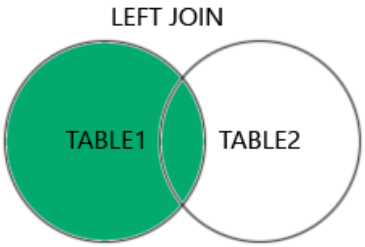
1. **INNER JOIN**
2. **LEFT JOIN**
3. **RIGHT JOIN**
4. **FULL JOIN**

1) **INNER JOIN:** Returns only the records with matching values in both tables.



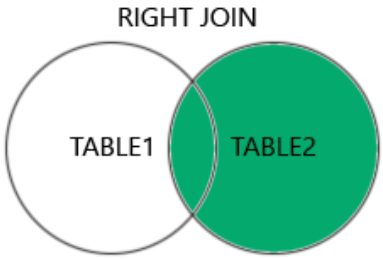

Syntax: - SELECT column_name from table1 **INNER JOIN** table2 **ON** table1.column_name = table2.column_name;

2) **LEFT JOIN:** Returns all records from the left table, and the matched records from the right table.



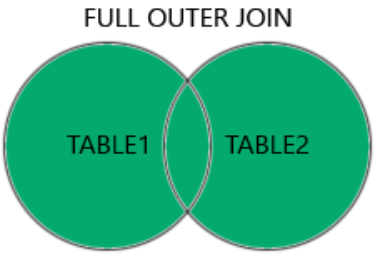

Syntax: - SELECT column_name from table1 **LEFT JOIN** table2 ON table1.column_name = table2.column_name;

3) **RIGHT JOIN:** Returns all records from the right table, and the matched records from the left table.




Syntax: - SELECT column_name from table1 **RIGHT JOIN** table2 ON table1.column_name = table2.column_name;

4) **FULL JOIN:** Return all records when there is a match in either left or right table.




Syntax: - SELECT column_name from table1 **FULL OUTER JOIN** table2 ON table1.column_name = table2.column_name;

## 5. What are triggers in SQL?

A trigger is a set of SQL statements that are automatically executed in response to a specific event, such as INSERT, UPDATE, or DELETE operations on a table.

## 6. What is stored procedure in SQL?

A **Stored Procedure** is a type of code in SQL that can be stored for later use and can be used many times.
So, whenever you need to execute the query, instead of calling it you can just call the stored procedure.

**Example**:

```
CREATE PROCEDURE Empdata
AS
SELECT *
FROM employee
        GO;
```

## 7. Explain all types of window functions?

[Mainly rank (), row_num (), dense_rank (), lead () and lag ()].

## 8. What is the difference between Truncate and Delete?

# DELETE V/S TRUNCATE

- **DELETE**

1) DML Command
2) 'DELETE' removes some or all rows.
3) Syntax:-
4) `DELETE * from student;`

To delete data with some conditions: -

5) `DELETE name from student WHERE <Condition>;`
6) It does not free the space containing the table.
7) Slower than TRUNCATE.

**TRUNCATE**

1) DDL Command
2) Can't use WHERE clause
3) 'TRUNCATE ' removes all the rows from the table.
4) Syntax:-

`TRUNCATE table student;`

5) It free the space containing the table.

## 9. What is the difference between DML, DDL, and DCL?

- DDL commands are used to define and control the database.
- DML is used to control and manipulate the data.

- DCL is used for security and access to the database.

**10. What are aggregate functions and when do we use them? Explain with few Examples.**

These functions are used to do operations from the values of the column and a single value is returned.

1. AVG()
2. COUNT()
3. FIRST()
4. LAST()
5. MAX()
6. MIN()
7. SUM()

11. Which is faster between CTE and Subquery?

CTE is better than Subquery.

Both promote **reusability, encapsulation,** and have **inputs and outputs**.

- **CTEs** allow for the creation of a named temporary result set that can be used multiple times throughout the query.
- **CTEs** can be referenced multiple times within a single query, while **subqueries** can only be referenced once. This can make **CTEs** more efficient, as they can reduce the number of times the same query needs to be executed.
- Another advantage of using **CTEs** is improved performance. Since **CTEs** are temporary result sets, they are stored in memory, which reduces the number of disk I/O operations required to retrieve the data. In contrast, subqueries may result in repeated scanning of the same table, leading to slower query performance.

**12. What are constraints and types of constraints?**

SQL constraints are used to specify rules for the data in a table.

The following constraints are commonly used in SQL:

NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK, DEFAULT,

CREATE INDEX

- **NOT NULL** -

  Ensures that a column cannot have a NULL value

  **Syntax**:-

  **CREATE table voting_list (Id int (10) PRIMARY KEY, Name Varchar (25) NOT NULL);**

- **UNIQUE** –

  Ensures that all values in a column are different.

  **Syntax**: -

  **CREATE table voting_list (Id int (10) PRIMARY KEY, Name Varchar (25) NOT NULL, Age int(10),Email_id varchar (50) UNIQUE);**

- **PRIMARY KEY** –

  A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table

  **Syntax**:-

  **CREATE table voting_list (Id int (10) PRIMARY KEY, Name Varchar (25) NOT NULL);**

- **FOREIGN KEY** –

  Prevents actions that would destroy links between tables

  **Syntax**:-

  **CREATE table Person (P_Id int (10) PRIMARY KEY, Name Varchar(25), FOREIGN KEY (C_ID) REFERENCES CUSTOMERS(C_ID));**

- **CHECK** –

  Ensures that the values in a column satisfies a specific condition

  **Syntax**: -

**CREATE table voting_list (ID int(10) PRIMARY KEY, Name Varchar (25) NOT NULL, Age int NOT NULL CHECK (AGE>=18));**

- **DEFAULT** –

  Sets a default value for a column if no value is specified

  **Syntax**: - **CREATE table voting_list (ID int(10) PRIMARY KEY, Name Varchar (25) NOT NULL, Age int(10) NOT NULL DEFAULT 18);**

- **CREATE INDEX** –

  Used to create and retrieve data from the database very quickly

  **Syntax**: - **create index studentindex ON student (Name,Address);**

## 13.Types of keys?

### 1. Primary Key: -

- A unique identifier for each record in a table.
- Cannot be null
- A table can have only one primary key

### 2. Candidate Key: -

- Minimal super key
- A primary key can be selected from candidate key
- There can be more than one candidate key in a table.

### 3. Alternate key: -

- Apart from primary key, all keys in candidate keys are Alternate key.

### 4. Foreign key: -

- Links two table together
- Attribute of one table refer to primary key in another table.

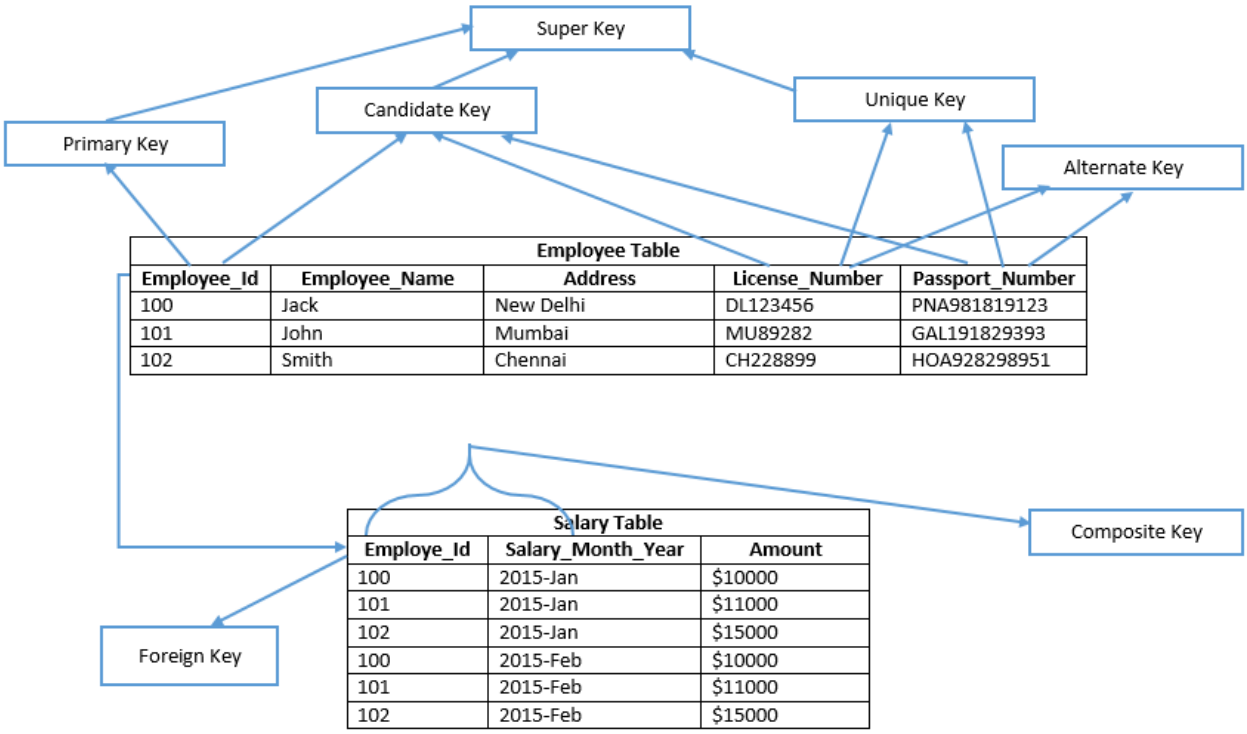
- It maintains referential integrity

## 5. Composite Key: -

A combination of two or more columns used as a primary key. It is used when a single column is not sufficient to uniquely identify a record.

## 6. Super key: -

- Superset of candidate key
- A table can have multiple super key




**Employee Table**

| Employee_Id | Employee_Name | Address | License_Number | Passport_Number |
|---|---|---|---|---|
| 100 | Jack | New Delhi | DL123456 | PNA981819123 |
| 101 | John | Mumbai | MU89282 | GAL191829393 |
| 102 | Smith | Chennai | CH228899 | HOA928298951 |

**Salary Table**

| Employe_Id | Salary_Month_Year | Amount |
|---|---|---|
| 100 | 2015-Jan | $10000 |
| 101 | 2015-Jan | $11000 |
| 102 | 2015-Jan | $15000 |
| 100 | 2015-Feb | $10000 |
| 101 | 2015-Feb | $11000 |
| 102 | 2015-Feb | $15000 |

## 14. Different types of operators?

- Arithmetic operators
- Arithmetic
- Bitwise
- Comparison
- Compound
- Logical
- String.

## 15.Difference between Group by and Where clause?

| Where Clause | Group by Clause |
|---|---|
| Where Clause is generally used to filter the rows from a table based on a specific condition. | Group by clause is used to group rows by one or more columns. |
| It does not involve an aggregate function. | It involves aggregations functions like SUM(), AVG(), COUNT(),MAX() etc. |
| Where clause is used with select, update, and with delete statements. | It is used only with select statements. |
| Its affected individual rows. | It affects the whole group of rows to perform aggregate functions. |
| It does not involve having clause. | It involves having clause. |

**WHERE** is used to filter records before any groupings take place that is on single rows,
**GROUP BY** aggregates/ groups the rows and returns the summary for each group and
**HAVING** is used to filter values after they have been grouped.

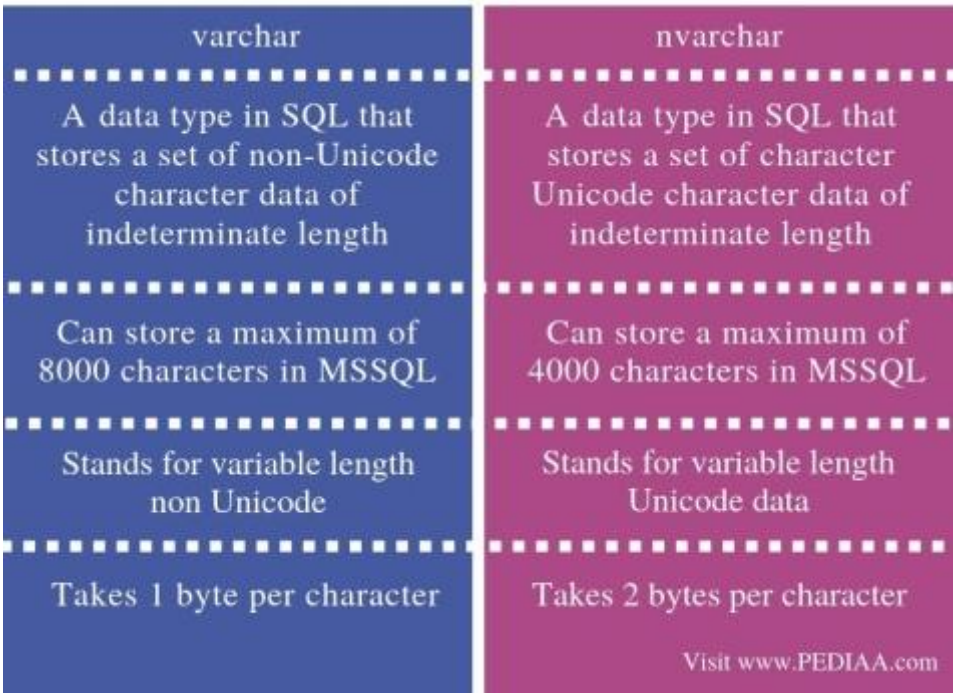
## 16.What are views?

In SQL, a view is a virtual table based on the result-set of an SQL statement.

A view contains rows and columns, just like a real table.

Syntax:- CREATE VIEW view_name AS
SELECT column1, column2, ...
FROM table_name
WHERE condition;

## 17. What is the difference between VARCHAR and nvarchar?

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## 18. What is the difference between CHAR and nchar?

### Differences of char, nchar, varchar and nvarchar in SQL Server

| | char | nchar | varchar | nvarchar |
|---|---|---|---|---|
| Character Data Type | Non-Unicode fixed-length | Unicode fixed-length can store both non-Unicode and Unicode characters (i.e. Japanese, Korean etc.) | Non-Unicode variable length | Unicode variable length can store both non-Unicode and Unicode characters (i.e. Japanese, Korean etc.) |
| Maximum Length | up to 8,000 characters | up to 4,000 characters | up to 8,000 characters | up to 4,000 characters |
| Character Size | takes up 1 byte per character | takes up 2 bytes per Unicode/Non-Unicode character | takes up 1 byte per character | takes up 2 bytes per Unicode/Non-Unicode character |
| Storage Size | n bytes | 2 times n bytes | Actual Length (in bytes) | 2 times Actual Length (in bytes) |

## 19. What are index and their types?

Indexes are used to retrieve data from the database more quickly.

**Syntax:**

CREATE INDEX index_name ON table_name (column1, column2,…);

Note: - Updating a table with indexes takes more time than updating a table without index because **indexes also need an update**.

## 20. List the different types of relationships in SQL?

1. One to One relationship
2. One to many or many to one relationship
3. Many to many relationships

## 21. Differentiate between UNION and UNION ALL

### UNION V/S UNION ALL

1. Removes duplicate records.

**2. Table: - Customer**

| Id | Address |
|---|---|
| 101 | Delhi |
| 102 | Mumbai |
| 103 | Noida |

```
SELECT * from Customer
UNION
SELECT * from Supplier;
```

**3. Output: -**

| Id | Address |
|---|---|
| 101 | Delhi |
| 102 | Mumbai |
| 103 | Noida |
| 107 | Delhi |

1. Keep all records, including duplicates.

**2. Table: - Supplier**

```
SELECT Address from Customer
UNION ALL
SELECT Address from Supplier;
```

| Id | Address |
|---|---|
| 101 | Delhi |
| 103 | Noida |
| 107 | Delhi |

**3. Output: -**

| Id | Address |
|---|---|
| 101 | Delhi |
| 101 | Delhi |
| 102 | Mumbai |
| 103 | Noida |
| 103 | Noida |
| 107 | Delhi |

**NOTE: -**

1. Must be same number of columns retrieved.
2. Column retrieved must be in the same order.
3. Column retrieved must be of **similar data type**.

## 22. How many types of clauses in SQL?

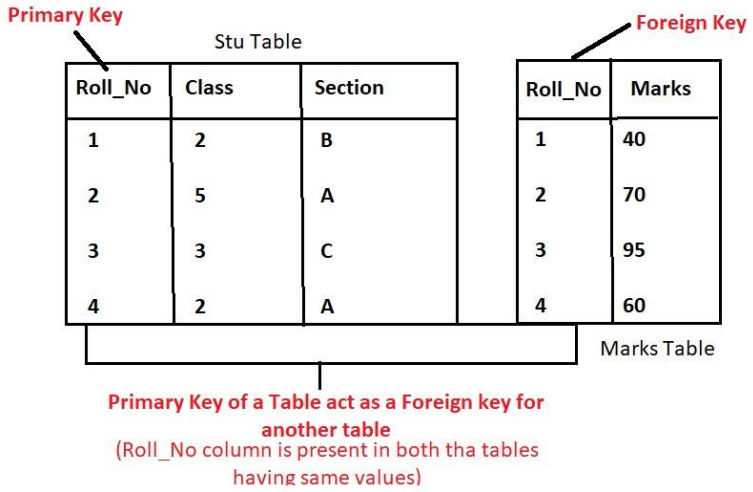
1. WHERE CLAUSE
2. GROUP BY CLAUSE
3. HAVING CLAUSE
4. ORDER BY CLAUSE

## 23. Difference between PRIMARY KEY and FOREIGN KEY?

Primary keys serve as unique identifiers for each row in a database table.

Foreign keys link data in one table to the data in another table.

A foreign key column in a table points to a column with unique values in another table (often the primary key column) to create a way of cross-referencing the two tables.




## 24. Find the second highest salary of an employee?

## 25. Write retention query in SQL.

## 26. Write year-on-year growth in SQL?

## 27. Write a query for cumulative sum in SQL?

## 28. Difference between Function and stored procedure?

A function returns a value and can be used in SQL statements,
Where as a stored procedure does not return a value directly but can perform various actions.

## 29. Do we use variable in views?

## 30. What are the limitations of views?

1) When a table is dropped, view will be affected.

2) If column name is renamed then view will show exception "Invalid column name".

3) When table is not there view will not work.

# SQL Interview Question

1. What is the difference between SQL and MySQL or SQL Server?

   SQL or Structured Query Language is a language; language that communicates with a relational database thus providing ways of manipulating and creating databases.

   MySQL and Microsoft's SQL Server both are relational database management systems that use SQL as their standard relational database language.

2. What is the difference between SQL and PL/SQL?

   PL/SQL is a dialect of SQL that adds procedural features of programming languages in SQL. It was developed by Oracle Corporation in the early 90's to enhance the capabilities of SQL.

3. What are various DDL commands in SQL? Give brief description of their purposes.

   Following are various DDL or Data Definition Language commands in

   SQL –

   **CREATE –** it creates a new table, a view of a table, or other object in database.

   **ALTER –** it modifies an existing database object, such as a table.

   **DROP –** it deletes an entire table, a view of a table or other object in the database.

4. What are various DML commands in SQL? Give brief description of their

   purposes.

   DML means Data Manipulation Language

   Following are various DML commands in SQL –

   **SELECT –** it retrieves certain records from one or more tables.

   **INSERT –** it is used to insert/add a record.

   **UPDATE –** it modifies records.

**DELETE** – it deletes records.

5. What are various DCL commands in SQL? Give brief description of their purposes.

   DCL = Data Control Language

   Following are various DCL commands in SQL –

   **GRANT** – it gives a privilege to user.

   **REVOKE** – it takes back privileges granted from user.

6. **Can you sort a column using a column alias?**

   Yes. A column alias could be used in the ORDER BY clause.

7. **Is a NULL value same as zero or a blank space? If not then what is the difference?**

   A NULL value is not same as zero or a blank space. A NULL value is a value which is '**unavailable,unassigned, unknown or not applicable'**. Whereas, zero is a **number** and blank space is a **character.**

8. Say True or False. Give explanation if False.

   If a column value taking part in an arithmetic expression is NULL, then the result obtained would be NULL.

   True.

9. If a table contains duplicate rows, does a query result display the duplicate values by default? Howcan you eliminate duplicate rows from a query result?

   A query result displays all rows including the duplicate rows. To eliminate duplicate rows in theresult, the **DISTINCT** keyword is used in the SELECT clause.

10. What is the purpose of the condition operators BETWEEN and IN?

The BETWEEN operator displays rows based on a range of values. The IN condition operatorchecks for values contained in a specific set of values.

11. How do you search for a value in a database table when you don't have the exact value to searchfor?

In such cases, the LIKE condition operator is used to select rows that match a character pattern.This is also called 'wildcard' search.

12. What is the default ordering of data using the ORDER BY clause? How could it be changed?

The default sorting order is **ascending.** It can be changed using the DESC keyword, after thecolumn name in the ORDER BY clause.

13.What are the specific uses of SQL functions?

SQL functions have the following uses –

- Performing calculations on dataModifying individual data items
- Manipulating the output Formatting dates and numbers
- Converting data types

14.What are the case manipulation functions of SQL?

To change the case of character strings:-

**LOWER, UPPER, INITCAP**

15.Which function returns the remainder in a division operation?

The MOD function returns the remainder in a division operation.

16. What is the purpose of the NVL function?

The NVL function converts a NULL value to an actual value.

17.What is the difference between the NVL and the NVL2 functions?

The NVL*exp*1, *exp*2 function converts the source expression *or value* exp1 to the target expression

*orvalue* exp2, if exp1 contains NULL. The return value has the same data type as that of exp1.

The NVL2*exp*1, *exp*2, *exp*3 function checks the first expression exp1, if it is not null then, the secondexpression exp2 is returned. If the first expression exp1 is null, then the third expression exp3 is returned.

18. What is the use of the NULLIF function?

The NULLIF function compares two expressions. If they are equal, the function returns null. If theyare not equal, the first expression is returned.

19. Discuss the syntax and use of the COALESCE function?

The COALESCE function has the expression

COALESCE (exp1, exp2, …. expn)

It returns the first non-null expression given in the parameter list.

20. Say True or False. Give explanation if False.

COUNT * returns the number of columns in a table.

False. COUNT * returns the number of rows in a table.

21. What's wrong in the following query?

```
SELECT subject_code, count(name)FROM students;
```

It doesn't have a GROUP BY clause. The subject_code should be in the

GROUP BY clause.

```
SELECT subject_code, count(name)FROM students GROUP BY subject_code;
```

The WHERE clause cannot be used to restrict groups. The HAVING clause should be used.

```
SELECT subject_code, AVG(marks)FROM students
HAVING AVG(marks) > 75 GROUP BY subject_code;
```

22. Which expressions or functions allow you to implement conditional processing in a SQL statement?

- There are two ways to implement conditional processing
  - IF-THEN-ELSE logic in a SQL statement
  - Using CASE expression Using the DECODE function

23. You want to display a result query from joining two tables with 20 and 10 rows respectively. Erroneously you forget to write the WHERE clause. What would be the result?

The result would be the Cartesian product of two tables with 20 x 10 = 200 rows.

24. What is the difference between cross joins and natural joins?

The cross join produces the cross product or Cartesian product of two tables. The natural join is based on all the columns having same name and data types in both the tables.

25. What is the purpose of the group functions in SQL? Give some examples of group functions.

Group functions in SQL work on sets of rows and returns one result per group. Examples of group functions are AVG, COUNT, MAX, MIN, STDDEV, SUM, VARIANCE.

26. Say True or False. Give explanation if False.

By default the group functions consider only distinct values in the set.

By default, group functions consider all values including the duplicate values.

27. Say True or False. Give explanation if False.

The DISTINCT keyword allows a function consider only non-duplicate values.

True.

28. Say True or False. Give explanation if False.Group functions cannot be nested.

False. Group functions can be nested to a depth of two.

29. What do you understand by a Subquery? When is it used?

A Subquery is a SELECT statement embedded in a clause of another SELECT statement. It is usedwhen the inner query or the Subquery returns a value that is used by the outer query. It is very useful in selecting some rows in a table with a condition that depends on some data which is contained in the same table.

30.Say True or False. Give explanation if False.

A single row Subquery returns only one row from the outer SELECT statement?

False. A single row Subquery returns only one row from the inner SELECT statement.

31.Say True or False. Give explanation if False.

A multiple row Subquery returns more than one row from the inner SELECT statement.

True.

32.Say True or False. Give explanation if False.

Multiple column subqueries return more than one column from the inner SELECT statement.

True.

33.What's wrong in the following query?

```
SELECT student_code,
nameFROM students
WHERE marks =
(SELECT MAX(marks)
FROM students
GROUP BY subject_code);
```

Here a single row operator = is used with a multiple row Subquery.

34. What are the various multiple row comparison operators in SQL?

IN, ANY, ALL.

35. What is the purpose of DML statements in SQL?

The DML statements are used to add new rows to a table, update or modify data in existing rows,or remove existing rows from a table.

36 Which statement is used to add a new row in a database table?

The INSERT INTO statement.

37. Say True or False. Give explanation if False.

While inserting new rows in a table you must list values in the default order of the columns.

True.

38. How do you insert null values in a column while inserting data?

- Implicitly by omitting the column from the column list.
- Explicitly by specifying the NULL keyword in the VALUES clause.

39. Say True or False. Give explanation if False.

INSERT statement does not allow copying rows from one table to another.

False. INSERT statement allows to add rows to a table

copying rows from an existing table.

40. How do you copy rows from one table to another?

The INSERT statement can be used to add rows to a table by copying from another table.
In thiscase, a Subquery is used in the place of the VALUES clause.

41. What happens if you omit the WHERE clause in the UPDATE statement?

All the rows in the table are modified.

42. Can you modify the rows in a table based on values from another table? Explain.

Yes. Use of subqueries in UPDATE statements allow you to update rows in a table based on valuesfrom another table.

43. Say True or False. Give explanation if False.

The DELETE statement is used to delete a table from the database.

False. The DELETE statement is used for removing existing rows from a table.

44. What happens if you omit the WHERE clause in a delete statement?

All the rows in the table are deleted.

45. Can you remove rows from a table based on values from another table? Explain.

Yes, subqueries can be used to remove rows from a table based on values from another table.

46. Say True or False. Give explanation if False.

Attempting to delete a record with a value attached to an

integrity constraint, returns an error.

True.

47. Say True or False. Give explanation if False.

You can use a Subquery in an INSERT statement.

True.

48. What is the purpose of the MERGE statement in SQL?

The MERGE statement allows conditional update or insertion of data into a database table. Itperforms an UPDATE if the rows exist or an INSERT if the row does not exist.

49. Say True or False. Give explanation if False.

A DDL statement or a DCL statement is automatically

committed.

True.

50. What is the difference between VARCHAR2 AND CHAR data types?

VARCHAR2 represents variable length character data, whereas CHAR represents fixed length character data.

51. Say True or False. Give explanation if False.

A DROP TABLE statement can be rolled back.

False. A DROP TABLE statement cannot be rolled back.

52. Which SQL statement is used to add, modify or drop columns in a database table?

The ALTER TABLE statement.

## 53. What is a view? Why should you use a view?

A view is a logical snapshot based on a table or another view.

It is used for –

- Restricting access to data;
- Making complex queries simple;
- Ensuring data independency;
- Providing different views of same data.

## 54. Say True or False. Give explanation if False.

A view doesn't have data of its own.

True.