1. **What is SQL, and why is it essential in database management?**

**Ans:- SQL, or Structured Query Language, is the standard language for interacting with relational databases.**

**It allows users to store, retrieve, manipulate, and manage data efficiently.**

**Why is SQL Essential in Database Management?**

* **Data Retrieval & Manipulation – SQL helps query data using commands like SELECT, INSERT, UPDATE, and DELETE, making it easy to modify stored information.**
* **Data Organization – With SQL, data can be structured into tables using schemas, ensuring consistency and integrity.**
* **Filtering & Sorting – Advanced queries enable users to filter results (WHERE clause), sort them (ORDER BY), and aggregate data (GROUP BY).**
* **Transaction Management – Features like COMMIT, ROLLBACK, and SAVEPOINT ensure data integrity in case of errors or failures.**
* **Security & Access Control – SQL allows user authentication and permission settings (GRANT, REVOKE), ensuring data is accessed only by authorized individuals.**

1. **Explain the difference between DBMS and RDBMS.**

**Ans:-**

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| **Difference Between DBMS & RDBMS** | | |
| **Feature** | **DBMS (Database Management System)** | **RDBMS (Relational Database Management System)** |
| **Data Structure** | **Stores data as files or collections** | **Stores data in tabular form (rows & columns)** |
| **Data Relationships** | **No strict relationships between data** | **Uses relationships with primary & foreign keys** |
| **Normalization** | **No support for normalization** | **Supports normalization to eliminate redundancy** |
| **Efficiency** | **Less efficient for handling large amounts of data** | **Optimized for complex queries and large datasets** |
| **Security** | **Basic security mechanisms** | **Advanced security features like user roles & permissions** |
| **Examples** | **XML, CSV, key-value stores** | **MySQL, PostgreSQL, SQLite, SQL Server** |
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1. **Describe the role of SQL in managing relational databases.**

**Ans:- SQL plays a crucial role in managing relational database by enabling efficient data storage, retravel and manipulation of data.**

1. **What are the key features of SQL?**

**1. DDL:-Data Definition Language.**

**2. DML:-Data manipulation Language**

**3. DQL:-Data Query Language.**

**4. DCL:-Data Control Language.**

**5. TCL:- Transaction Control**

**5. What are the basic components of SQL syntax?**

**SQL statements like DDL,DML,DQL,DCL,TCL.**

**SQL Queries are clauses to refine operations and its like where, order by, group by, Having.**

**SQL supports Multiple Operators like Arithmetic, logical and comparison.**

**SQL provides multiple function like aggregate, string and Date.**

**6.Write the general structure of an SQL SELECT statement.**

**The following are the select structures.**

**Select \* from table name;( full table).**

**Select field Name (Column) from Table name where(condition).**

**Select \* from Table Name where field(column) between Value-1 & Value-2.**

**Select Aggregate function from table name; …**

**7.Explain the role of clauses in SQL statements.**

**Clauses in SQL help refine queries and control how data is retrieved, filtered, grouped, and sorted.**

**They act as modifiers to SQL statements, allowing for precise data selection and manipulation**

**8. What are constraints in SQL? List and explain the different types of constraints.**

**The followings are SQL constraints. Examples are**

**PK:- Primary Key**

**NN:- Not Null**

**AI:- Auto Increment**

**UK:- Unique Key**

**FK:- Foreign key**

**Check and Default are the SQL Constraints.**

**9.How do PRIMARY KEY and FOREIGN KEY constraints differ?**

**Primary Key: This is a unique identifier for a record in a table. It ensures that each row has a distinct value, preventing duplication. A table can have only one primary key, and its values cannot be NULL.**

**Foreign Key: This is a field in one table that refers to the primary key in another table. It helps maintain referential integrity by linking records across tables. Unlike primary keys, foreign key values can be duplicated and may contain NULL values, depending on constraints.**

**10.What is the role of NOT NULL and UNIQUE constraints?**

**Not Null:- Not Null means ensure that column cannot contain null values. Example like E-mail field.**

**Unique Value:- It means ensure that column are distinct(No duplicate allows), example like Email, username etc…**

**11.Define the SQL Data Definition Language (DDL).**

**DDL:- Data Definition language consist of command used to define and manage the structure of database. It contain Create,Alter, Drop and Truncate.**

**12.Explain the CREATE command and its syntax.**

**CREATE:- It Defines as ,to Create a new database object like (table,view etc)**

**SYNTAX:- create table table Name(ID integer primary key auto\_increment,**

**Name varchar(20),**

**City varchar(20),**

**Age integer);**

**13.What is the purpose of specifying data types and constraints during table creation?**

**Specifying data types and constraints during table creation is crucial for maintaining data integrity, optimizing storage, and ensuring efficient operations in a database.**

**14.What is the use of the ALTER command in SQL?**

**ALTER:- It is use for change in data like modifying table object like add column etc..**

**And its syntax like here,**

**Alter table Tablename add column name varchar(20);**

**15.How can you add, modify, and drop columns from a table using ALTER?**

**Add:- Alter table Tablename add column name varchar(20); for add new Column.**

**Modify:- Alter table Tablename Modify column name varchar(20); for change data type or constraints.**

**Drop:- Alter table Tablename Drop column column-name; for use Drop any column.**

**16.What is the function of the DROP command in SQL?**

**DROP:- Drop command use for Remove column from existing Table and its syntax like**

**Alter table Tablename Drop column column-name;**

**17.What are the implications of dropping a table from a database?**

**It permanently removes table and all its contain.**

* 1. **Permanent Data loss**
  2. **Impact on Relationship.**
  3. **Loss of schema & constraints**
  4. **Effect on performance**

**18.Define the INSERT, UPDATE, and DELETE commands in SQL.**

**These all commands are use for manipulate data within a database table. These commands are part of DML.**

**Insert: - Adding data into table.**

**Update: -Modifying Existing Data.**

**Delete: - used to delete specific records from a table.**

**19.What is the importance of the WHERE clause in UPDATE and DELETE operations?**

**The where clause is important for update and delete operation because it helps target specific data or records for modifying or remove.**

**20.What is the SELECT statement, and how is it used to query data?**

**The SELECT statement in SQL is used to retrieve data from one or more tables in a database. It allows users to filter, sort, and manipulate data based on specific conditions.**

**Syntax:- select \* from table name; basic syntax for retrieve full data.**

**21.Explain the use of the ORDER BY and WHERE clauses in SQL queries.**

**Where :- this is used to filter records based on specified condition, it helps you retrieve only the rows that meet certain criteria.**

**Order By:- This is used to sort the result set in either ascending or descending.**

**22.What is the purpose of GRANT and REVOKE in SQL?**

**GRANT: This command is used to give specific privileges to a user or role. For example, if you want to allow a user to select data from a table, you can use.**

**REVOKE: This command removes previously granted permissions. If you want to revoke granted access from User.**

**23.How do you manage privileges using these commands?**

**Granting privileges: -use the “Grant” command to assign multiple permission to user.**

**Revoke privileges: - use the “Revoke” command to Remove Multiple permission.**

**24.What is the purpose of the COMMIT and ROLLBACK commands in SQL?**

**Commit: This command saves all changes made during the current transaction permanently in the database. Once committed, the changes cannot be undone.**

**Roll back: - This command undoes all changes made in the current transaction, reverting the database to its previous state.**

**25.Explain how transactions are managed in SQL databases.**

**Transactions in SQL databases ensure data consistency, integrity, and reliability by grouping multiple operations into a single unit of work. They follow the ACID properties:**

1. **Atomicity – Ensures that either all operations in a transaction are completed successfully, or none are. If any part fails, the transaction is rolled back.**
2. **Consistency – Guarantees that transactions bring the database from one valid state to another, maintaining integrity constraints.**
3. **Isolation – Ensures that concurrent transactions do not interfere with each other, preventing conflicts or incorrect results.**
4. **Durability – Once a transaction is committed, its changes are permanently stored in the database, even if a system failure occurs.**

**26.Explain the concept of JOIN in SQL. What is the difference between INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN?**

**The join operation in SQL is used to combine rows from two or more tables based on related column.**

**It’s used for retrieve meaningful data between different data set.**

**Inner Join: Returns only the matching rows from both tables.**

**Left Join: Returns all rows from the left table and matching rows from the right table. Unmatched rows in the right table appear as Null.**

**Right Join: Returns all rows from the right table and matching rows from the left table. Unmatched rows in the left table appear as Null.**

**Full After Join: Returns all rows from both tables. Where there are matches, it joins them, but where there are no matches, Nulls appear.**

**27.How are joins used to combine data from multiple tables?**

**The join operation in SQL is used to combine rows from two or more tables based on related column.**

**It’s used for retrieve meaningful data between different data set.**

**When table are related by a column key like” ID” join enable queries to extract and combine data in useful ways.**

**28.What is the GROUP BY clause in SQL? How is it used with aggregate functions?**

**The GROUP BY clause in SQL is used to group rows that have the same values in specified columns into summary rows.**

**It is commonly used with aggregate functions like COUNT, SUM, AVG, MAX, and MIN to perform operations on groups of data.**

**29.Explain the difference between GROUP BY and ORDER BY.**

**The GROUP BY and ORDER BY clauses in SQL serve distinct purposes, but they are often used together in queries.**

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| **Key Difference** | | |
| **Clause** | **Purpose** | **Works with** |
| **Group-By** | **The GROUP BY and ORDER BY clauses in SQL serve distinct purposes, but they are often used together in queries.** | **Aggregate functions (SUM, COUNT, AVG, etc.)** |
| **Order-By** | **Sorts the result set based on specified columns.** | **Any column or computed value** |

**30.What is a stored procedure in SQL, and how does it differ from a standard SQL query?**

**A stored procedure in SQL is a precompiled set of SQL statements that perform a specific task and can be executed with a single call. Stored procedures are stored in the database and can be reused multiple times, improving efficiency and security.**

**If we need sometimes fetch same data from Table, instead of writing query every time ,we create stored procedure.**

**31.Explain the advantages of using stored procedures.**

**Advantages of Stored Procedures**

1. **Improved Performance – Precompiled execution reduces overhead.**
2. **Security – Restricts direct table access and prevents SQL injection.**
3. **Reusability – Can be used across multiple applications or queries.**
4. **Maintainability – Centralized logic makes updates easier.**

**Stored procedures are essential for complex business logic and automation.**

**32.What is a view in SQL, and how is it different from a table?**

**A view in SQL is a virtual table that is created based on the result of a query. It does not store data itself but dynamically retrieves data from underlying tables whenever queried.**

**33.Explain the advantages of using views in SQL databases.**

**Advantages of Using Views**

1. **Simplifies Complex Queries – Predefined queries can be reused without rewriting them.**
2. **Enhances Security – Limits access by displaying only specific columns.**
3. **Encapsulates Logic – Ensures consistency across reports and applications.**

**34.What is a trigger in SQL? Describe its types and when they are used.**

**A trigger in SQL is a special type of stored procedure that automatically executes in response to specific events on a table, such as inserts, updates, or deletions. Triggers help enforce business rules, maintain data integrity, and automate processes.**

**There are mainly two types of Trigger, After & Before.**

**35.Explain the difference between INSERT, UPDATE, and DELETE triggers.**

**Insert trigger: - When a new Row is added to a table.**

**Update Trigger: -When a Row Modified.**

**Delete Trigger: - When a Row Deleted(removed).**

**36.What is PL/SQL, and how does it extend SQL's capabilities?**

**37.List and explain the benefits of using PL/SQL.**

**38.What are control structures in PL/SQL? Explain the IF-THEN and LOOP Control structures.**

**39.How do control structures in PL/SQL help in writing complex queries?**

**40.What is a cursor in PL/SQL? Explain the difference between implicit and explicit cursors.**

**41.When would you use an explicit cursor over an implicit one?**

**42.Explain the concept of SAVEPOINT in transaction management. How do ROLLBACK and COMMIT interact with save points?**

**A Save points marks a specific point within a transaction. If an error occurs after a save point, you can roll back only to that point instead of undoing all changes. This is useful in complex operations where partial failures should not cancel the entire transaction.**

**Commit – Saves all changes permanently and releases all save points.**

**Rollback – If used without a save point, it undoes the entire transaction.**

**Rollback to Save point – Rolls back only to a specific checkpoint, keeping earlier successful operations intact.**

**43.When is it useful to use save points in a database transaction?**

**Save points in database transactions are useful when managing multi-step operations where partial rollback may be needed instead of undoing the entire transaction.**

**They provide finer control over error handling and help maintain data integrity**