

SQL & PL ASSIGNMENT

Theory

Introduction to SQL

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

Answer:

- SQL (Structured Query Language) is a standard language used to interact with relational databases.
- It enables creation, retrieval, updating, and deletion of data (CRUD operations).
- SQL ensures data accuracy, consistency, and security.
- It allows applying constraints, managing transactions, and defining database structures.

2. Explain the difference between DBMS and RDBMS.

Answer:

- DBMS manages data without relationships between tables.
- RDBMS supports relational tables linked using primary and foreign keys.
- RDBMS supports normalization, reducing redundancy.
- RDBMS provides higher data integrity, security, and follows SQL standards.

3. Describe the role of SQL in managing relational databases.

Answer:

- SQL defines tables, relationships, and constraints.
- It retrieves and manipulates relational data efficiently.
- SQL ensures referential integrity and supports joins to combine tables.
- Helps in controlling access, permissions, and managing transactions.

4. What are the key features of SQL?

Answer:

- Simple syntax and easy to learn.
- Supports DDL, DML, DCL, and TCL commands.
- Allows fast and complex querying.
- Supports joins, filtering, grouping, and aggregate functions.
- Uses standardized commands across database systems.

SQL Syntax

1. What are the basic components of SQL syntax?

Answer:

- Keywords (SELECT, INSERT, UPDATE).
- Clauses (WHERE, ORDER BY, GROUP BY).
- Expressions and conditions.
- Identifiers (column names, table names).
- Queries end with a semicolon.

2. General structure of SELECT statement.

Answer:

- SELECT column_list
- FROM table_name
- WHERE condition
- GROUP BY column_name
- HAVING group_condition
- ORDER BY column_name ASC/DESC

3. Explain the role of clauses in SQL.

Answer:

- WHERE → filters rows.
- ORDER BY → sorts rows.
- GROUP BY → groups rows with same values.
- HAVING → filters grouped data.

SQL Constraints

1. What are constraints in SQL? List and explain types.

Answer:

- Constraints maintain accurate and reliable data.
- PRIMARY KEY: uniquely identifies a row.
- FOREIGN KEY: establishes relation between tables.
- UNIQUE: ensures values are not duplicated.
- NOT NULL: value cannot be empty.
- CHECK: restricts values based on a condition.
- DEFAULT: sets default value for a column.

2. Difference between PRIMARY KEY and FOREIGN KEY.

Answer:

- PRIMARY KEY is unique and identifies each row.
- FOREIGN KEY refers to primary key of another table.
- Primary ensures uniqueness; foreign ensures relational integrity.

3. Role of NOT NULL and UNIQUE.

Answer:

- NOT NULL ensures mandatory values.
- UNIQUE prevents duplicate values in a column.

Main SQL Commands and Sub-commands (DDL)

1. Define SQL Data Definition Language (DDL).

Answer:

- DDL defines and manages database structure.
- Includes CREATE, ALTER, DROP, and TRUNCATE.

2. Explain CREATE command.

Answer:

- Used to create tables/databases.
- Syntax: CREATE TABLE table_name (column datatype constraints);

3. Importance of data types and constraints.

Answer:

- Data types ensure correct format.
- Constraints ensure valid, consistent data.

ALTER Command

1. What is ALTER used for?

Answer:

- ALTER modifies existing table structure.

2. Adding, modifying, dropping columns.

Answer:

- ADD COLUMN → adds new field.
- MODIFY COLUMN → changes datatype/size.
- DROP COLUMN → deletes a column.

DROP Command

1. Function of DROP command.

Answer:

- DROP deletes tables/databases permanently.

2. Implications of dropping a table.

Answer:

- Table and its data are permanently removed.
- Cannot be recovered unless backed up.

Data Manipulation Language (DML)

1. Define INSERT, UPDATE, DELETE.

Answer:

- INSERT → adds new data.
- UPDATE → modifies existing data.
- DELETE → removes data.

2. Importance of WHERE in UPDATE/DELETE.

Answer:

- Prevents modification/deletion of all rows.
- Targets specific records only.

What is Data Query Language?

Answer:

- DQL fetches data using SELECT command.

Data Query Language (DQL)

1. Purpose of GRANT and REVOKE.

Answer:

- GRANT → gives permissions.
- REVOKE → removes permissions.

2. Managing privileges.

Answer:

- Admin assigns user access like SELECT, INSERT, UPDATE.
- REVOKE removes unnecessary permissions.

Data Control Language (DCL)

1. Purpose of COMMIT and ROLLBACK.

Answer:

- COMMIT saves changes permanently.
- ROLLBACK undoes changes.

2. Transaction management.

Answer:

- Uses ACID properties.
- Ensures safe and reliable data operations.

Transaction Control Language (TCL)

1. Explain JOIN and types.

Answer:

- JOIN merges data from multiple tables.
- INNER JOIN → matching rows.
- LEFT JOIN → all left + matched right.
- RIGHT JOIN → all right + matched left.
- FULL JOIN → all rows.

2. How joins combine data?

Answer:

- Using related columns between tables.

SQL Joins

1. What is GROUP BY?

Answer:

- Groups identical values.
- Used with COUNT, SUM, AVG, MIN, MAX.

2. GROUP BY vs ORDER BY.

Answer:

- GROUP BY groups records.
- ORDER BY sorts records.

SQL Group By

1. What is a stored procedure?

Answer:

- Precompiled SQL program stored in database.

2. Advantages.

Answer:

- Improves performance.
- Reusable.
- Enhances security.

SQL Stored Procedure

1. What is a view?

Answer:

- Virtual table created using SQL query.
- Does not store data physically.

2. Advantages of views.

Answer:

- Simplifies queries.
- Increases security.
- Hides sensitive data.

SQL View

1. What is a trigger?

Answer:

- Automatically runs on INSERT/UPDATE/DELETE.

2. Difference between triggers.

Answer:

- INSERT trigger fires on insertion.
- UPDATE trigger fires when data changes.
- DELETE trigger fires before/after deletion.

SQL Triggers

1. What is PL/SQL?

Answer:

- Procedural Language/SQL by Oracle.
- Supports variables, loops, functions, and error handling.

2. Benefits of PL/SQL.

Answer:

- Improved performance.
- Modular programming.
- Strong exception handling.
- Better productivity.

Introduction to PL/SQL

1. What are control structures?

Answer:

- Allow decision making and looping.
- IF-THEN executes based on conditions.
- LOOP runs statements multiple times.

2. How control structures help?

Answer:

- Help write complex logical programs.
- Automate repetitive tasks.

SQL Cursors

1. What is a cursor?

Answer:

- Pointer to rows returned by a query.

Difference between implicit and explicit cursors.

Answer:

- Implicit are automatic.
- Explicit declared for multi-row processing.

2. When to use explicit cursor?

Answer:

- Used when row-by-row processing is required.

Rollback and Commit Save point

1. Explain SAVEPOINT.

Answer:

- Marks a point inside a transaction.
- ROLLBACK TO SAVEPOINT undoes partial changes.
- COMMIT finalizes changes.

2. When are savepoints useful?

Answer:

- Useful in large transactions.
- Allows partial undo without affecting entire transaction.