

DBMS Assignment

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

SQL (Structured Query Language) is a standard language used to store, manage, and retrieve data from a database.

It is essential because it allows users to:

- Create and manage databases.
- Insert, update, and delete data.
- Retrieve useful information using queries.
- Control access to data (security).

2. Explain the difference between DBMS and RDBMS.

DBMS: Database Management System – software that manages databases.

RDBMS: Relational Database Management System – manages databases in a table format.

Differences:

- DBMS stores data as files; RDBMS stores data in related tables.
- DBMS has no relations; RDBMS uses keys to relate tables.
- Examples: DBMS → MS Access; RDBMS → MySQL, Oracle.

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

SQL defines, manipulates, and queries data. Roles include:

- Defining data structures (CREATE, ALTER, DROP).
- Manipulating data (INSERT, UPDATE, DELETE).
- Querying data (SELECT).
- Controlling access (GRANT, REVOKE).
- Maintaining integrity (constraints).

4. What are the key features of SQL?

- Easy to learn and use.
- Allows data definition and manipulation.
- Supports security and integrity.
- Works with relational databases.
- Provides transaction management.

5. What are the basic components of SQL syntax?

- Keywords (SELECT, INSERT).
- Identifiers (table/column names).
- Clauses (WHERE, ORDER BY).
- Expressions (salary+bonus).
- Statements (SELECT * FROM table_name;).

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

```
SELECT column1, column2, ...  
FROM table_name  
WHERE condition  
GROUP BY column_name  
HAVING condition  
ORDER BY column_name;
```

7. Explain the role of clauses in SQL statements.

Clauses refine SQL queries:

- WHERE → filters rows.
- GROUP BY → groups rows.
- HAVING → applies conditions on groups.
- ORDER BY → sorts results.

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

Constraints maintain data accuracy and integrity.

Types: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE, CHECK, DEFAULT.

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

- PRIMARY KEY: Uniquely identifies records within a table.
- FOREIGN KEY: Links rows between two tables.

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

- NOT NULL: Column must always have a value.
- UNIQUE: Ensures all values are different (no duplicates).

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

DDL defines and manages database structures.

Examples: CREATE, ALTER, DROP, TRUNCATE.

12. Explain the CREATE command and its syntax.

Used to create database/table.

Syntax:

```
CREATE TABLE table_name (  
    column1 datatype constraint,  
    column2 datatype constraint  
);
```

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

- Data types ensure correct type of data.
- Constraints maintain integrity (no duplicates, no nulls).

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

ALTER modifies an existing table without deleting it.

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

Add: ALTER TABLE table ADD column_name datatype;

Modify: ALTER TABLE table MODIFY column_name datatype;

Drop: ALTER TABLE table DROP COLUMN column_name;

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

DROP permanently deletes a table, database, or object.

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

- Table and data permanently removed.
- Relationships broken.
- Cannot be undone without backup.

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

- INSERT: Adds new rows.
- UPDATE: Changes existing data.
- DELETE: Removes rows.

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

WHERE ensures only specific rows are affected. Without it, all rows change.

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

SELECT retrieves data from tables.

Example: SELECT name, age FROM students WHERE age > 18;

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

- WHERE filters rows.
- ORDER BY sorts results (ASC/DESC).

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

- GRANT gives permissions.
- REVOKE removes permissions.

23. How do you manage privileges using these commands?

GRANT SELECT ON students TO user1;
REVOKE SELECT ON students FROM user1;

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

- COMMIT saves changes permanently.
- ROLLBACK cancels changes.

25. Explain how transactions are managed in SQL databases.

Transactions group SQL operations. End with COMMIT or ROLLBACK. Ensures ACID properties.

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

JOIN combines data from multiple tables.

- INNER: matching rows only.
- LEFT: all left + matches.
- RIGHT: all right + matches.
- FULL OUTER: all rows, NULL where no match.

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

Joins use keys (PK, FK) to merge rows.

Example:

```
SELECT s.name, c.course_name FROM students s INNER JOIN courses c ON  
s.course_id=c.course_id;
```

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

GROUP BY groups rows by column values. Often with aggregates like COUNT, SUM, AVG.

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

- GROUP BY groups rows.
- ORDER BY sorts rows.

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

Stored procedure = saved block of SQL code, reusable. Standard query runs once.

31. Explain the advantages of using stored procedures.

- Reusable code.
- Better performance.
- Security.
- Reduces redundancy.

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

View = virtual table created from query.

Table stores actual data; view shows data.

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

- Simplifies queries.
- Provides security.
- Consistent data presentation.

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

Trigger = automatic action when INSERT/UPDATE/DELETE happens.

Types: BEFORE, AFTER, INSTEAD OF.

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

- INSERT: fires on new rows.
- UPDATE: fires on changes.
- DELETE: fires on removals.