1. \*\*Which SQL command is used to add a new column to an existing table?\*\*

- A) ADD COLUMN

- B) MODIFY COLUMN

- C) ALTER TABLE

- D) CREATE COLUMN

- \*\*Answer:\*\* C

2. \*\*What does the following SQL query do? `SELECT \* FROM Employees WHERE Department = 'Sales' AND Salary > 50000;`\*\*

- A) Retrieves all employees.

- B) Retrieves employees with a salary above 50,000.

- C) Retrieves employees in the Sales department with a salary above 50,000.

- D) Retrieves employees in the Sales department.

- \*\*Answer:\*\* C

3. \*\*Which SQL function would you use to find the largest value in a numeric column?\*\*

- A) MAX()

- B) MIN()

- C) COUNT()

- D) SUM()

- \*\*Answer:\*\* A

4. \*\*How would you retrieve records from a table in SQL with distinct values in a specific column?\*\*

- A) Use `UNIQUE`

- B) Use `DISTINCT`

- C) Use `DIFFERENT`

- D) Use `GROUP BY`

- \*\*Answer:\*\* B

5. \*\*What will the following query return? `SELECT COUNT(\*) FROM Customers WHERE Age IS NULL;`\*\*

- A) The total count of customers

- B) The count of customers with age specified

- C) The count of customers with unspecified age

- D) An error

- \*\*Answer:\*\* C

6. \*\*What does the `HAVING` clause do in SQL?\*\*

- A) Filters rows before aggregation

- B) Filters rows after aggregation

- C) Aggregates data in rows

- D) Adds a new column to the output

- \*\*Answer:\*\* B

7. \*\*How do you create a primary key on the 'id' column when creating a table?\*\*

- A) PRIMARY id

- B) PRIMARY KEY id

- C) PRIMARY KEY (id)

- D) id PRIMARY KEY

- \*\*Answer:\*\* C

8. \*\*Which SQL command removes all rows from a table without deleting the table?\*\*

- A) DELETE

- B) DROP

- C) TRUNCATE

- D) ERASE

- \*\*Answer:\*\* C

9. \*\*In SQL, what is the purpose of the `JOIN` keyword?\*\*

- A) To create a new table

- B) To retrieve data by combining rows from two or more tables

- C) To delete rows from multiple tables

- D) To update columns in a table

- \*\*Answer:\*\* B

10. \*\*What will `INNER JOIN` return when there is no match in the joined tables?\*\*

- A) All rows from the left table

- B) All rows from the right table

- C) Only the matching rows

- D) An empty result

- \*\*Answer:\*\* D

11. \*\*What is the purpose of `ON DELETE CASCADE` in SQL?\*\*

- A) Deletes rows only if they match certain conditions.

- B) Deletes rows in child tables if the related row in the parent table is deleted.

- C) Prevents rows in child tables from being deleted.

- D) None of the above

- \*\*Answer:\*\* B

12. \*\*Which SQL clause is used to sort the result set?\*\*

- A) WHERE

- B) SORT

- C) ORDER BY

- D) GROUP BY

- \*\*Answer:\*\* C

13. \*\*What is the default sorting order in SQL if not specified in `ORDER BY`?\*\*

- A) DESC

- B) ASC

- C) RANDOM

- D) NONE

- \*\*Answer:\*\* B

14. \*\*What is the difference between `CHAR` and `VARCHAR` data types?\*\*

- A) `CHAR` is fixed-length; `VARCHAR` is variable-length

- B) `VARCHAR` is fixed-length; `CHAR` is variable-length

- C) Both are fixed-length

- D) Both are variable-length

- \*\*Answer:\*\* A

15. \*\*Which SQL command is used to remove a specific column from a table?\*\*

- A) DELETE COLUMN

- B) ALTER TABLE ... DROP COLUMN

- C) DROP TABLE

- D) REMOVE COLUMN

- \*\*Answer:\*\* B

16. \*\*In SQL, what keyword is used to specify conditions for a group of records?\*\*

- A) WHERE

- B) HAVING

- C) GROUP BY

- D) ORDER BY

- \*\*Answer:\*\* B

17. \*\*What does the following SQL command do? `SELECT Name, COUNT(\*) FROM Students GROUP BY Name HAVING COUNT(\*) > 1;`\*\*

- A) Shows all students

- B) Shows students with unique names

- C) Shows students with duplicate names

- D) Returns an error

- \*\*Answer:\*\* C

18. \*\*Which function would you use to count the number of unique values in a column?\*\*

- A) COUNT(\*)

- B) COUNT(DISTINCT column)

- C) UNIQUE COUNT(column)

- D) DISTINCT COUNT(\*)

- \*\*Answer:\*\* B

19. \*\*What is the difference between `DELETE` and `TRUNCATE`?\*\*

- A) `DELETE` removes the table; `TRUNCATE` removes specific rows.

- B) `DELETE` removes rows without logging; `TRUNCATE` logs the removal.

- C) `DELETE` removes specific rows; `TRUNCATE` removes all rows.

- D) `TRUNCATE` removes rows without logging; `DELETE` logs the removal.

- \*\*Answer:\*\* C

20. \*\*What is a `UNION` in SQL?\*\*

- A) Combines rows from two tables including duplicates.

- B) Combines rows from two tables without duplicates.

- C) Joins two tables with a primary key.

- D) None of the above

- \*\*Answer:\*\* B

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21. \*\*Which of the following commands will create a foreign key constraint on a column?\*\*

- A) CREATE FOREIGN KEY

- B) ALTER TABLE ... ADD FOREIGN KEY

- C) ADD FOREIGN KEY TO COLUMN

- D) ALTER TABLE ... MODIFY FOREIGN KEY

- \*\*Answer:\*\* B

22. \*\*Which type of JOIN returns all rows from the left table and matched rows from the right table?\*\*

- A) LEFT JOIN

- B) RIGHT JOIN

- C) INNER JOIN

- D) FULL JOIN

- \*\*Answer:\*\* A

23. \*\*In SQL, what is the purpose of a `VIEW`?\*\*

- A) To store data permanently

- B) To simplify complex queries and store query results temporarily

- C) To update rows in a table

- D) To delete data from a table

- \*\*Answer:\*\* B

24. \*\*What SQL clause is used to set conditions on grouped data, typically with aggregate functions?\*\*

- A) ORDER BY

- B) GROUP BY

- C) HAVING

- D) WHERE

- \*\*Answer:\*\* C

25. \*\*What does the `EXISTS` operator do in SQL?\*\*

- A) Checks if a column has unique values

- B) Checks if a subquery returns any result

- C) Checks if a row exists in a table

- D) Checks for NULL values in a column

- \*\*Answer:\*\* B

Here are 15 hard-level SQL MCQs focused specifically on subqueries, joins, and group by.

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1. \*\*What does the following SQL query do? `SELECT e1.EmployeeID FROM Employees e1 WHERE e1.Salary > (SELECT AVG(e2.Salary) FROM Employees e2 WHERE e2.Department = e1.Department);`\*\*

- A) Returns all employees with a salary above the average salary of their department.

- B) Returns the average salary of each department.

- C) Returns employees with the highest salary in each department.

- D) Returns all employees with a salary below the average salary of their department.

- \*\*Answer:\*\* A

2. \*\*Which type of JOIN should be used to find rows in the left table that have no corresponding rows in the right table?\*\*

- A) INNER JOIN

- B) LEFT JOIN

- C) RIGHT JOIN

- D) CROSS JOIN

- \*\*Answer:\*\* B

3. \*\*What will the following query return? `SELECT department\_id, COUNT(employee\_id) FROM Employees GROUP BY department\_id HAVING COUNT(employee\_id) > 5;`\*\*

- A) Departments with more than five employees.

- B) Departments with exactly five employees.

- C) Employees grouped by department.

- D) All departments.

- \*\*Answer:\*\* A

4. \*\*In SQL, which of the following statements is true about the use of subqueries in the `SELECT` clause?\*\*

- A) Subqueries can be used to return scalar values in the `SELECT` clause.

- B) Subqueries are not allowed in the `SELECT` clause.

- C) Subqueries in the `SELECT` clause must return multiple rows.

- D) Subqueries cannot be used with aggregate functions.

- \*\*Answer:\*\* A

5. \*\*What is the result of this query? `SELECT department\_id, AVG(salary) FROM Employees GROUP BY department\_id HAVING AVG(salary) > (SELECT AVG(salary) FROM Employees);`\*\*

- A) Departments with an average salary greater than the company-wide average salary.

- B) Departments with an average salary less than the company-wide average salary.

- C) Employees with salary greater than the average salary of the company.

- D) Employees with salary greater than the average salary of their department.

- \*\*Answer:\*\* A

6. \*\*What does the following SQL query do? `SELECT EmployeeID, Salary FROM Employees WHERE Salary > ALL (SELECT Salary FROM Employees WHERE Department = 'HR');`\*\*

- A) Returns all employees in the HR department.

- B) Returns employees with the highest salary across all departments.

- C) Returns employees with a salary higher than any HR employee.

- D) Returns employees with a salary higher than all HR employees.

- \*\*Answer:\*\* D

7. \*\*Which JOIN would you use to return all rows from both tables, including unmatched rows with NULL values in place of missing matches?\*\*

- A) LEFT JOIN

- B) RIGHT JOIN

- C) INNER JOIN

- D) FULL OUTER JOIN

- \*\*Answer:\*\* D

8. \*\*What does the following query achieve? `SELECT department\_id, COUNT(employee\_id) AS num\_employees FROM Employees GROUP BY department\_id HAVING num\_employees = (SELECT MAX(counted) FROM (SELECT department\_id, COUNT(employee\_id) AS counted FROM Employees GROUP BY department\_id) AS temp);`\*\*

- A) Departments with the maximum number of employees.

- B) Departments with fewer than the maximum number of employees.

- C) Departments with exactly five employees.

- D) Returns an error.

- \*\*Answer:\*\* A

9. \*\*In which scenario would a correlated subquery be more suitable than a standard subquery?\*\*

- A) When needing to filter data based on aggregates.

- B) When each row of the main query needs to reference a different row set in the subquery.

- C) When the main query doesn’t depend on the subquery.

- D) When using JOINs for all filtering.

- \*\*Answer:\*\* B

10. \*\*What does this query do? `SELECT EmployeeID FROM Employees e1 WHERE EXISTS (SELECT \* FROM Employees e2 WHERE e2.ManagerID = e1.EmployeeID);`\*\*

- A) Returns employees who do not manage anyone.

- B) Returns all employees.

- C) Returns employees who are managers.

- D) Returns employees with no assigned manager.

- \*\*Answer:\*\* C

11. \*\*Which of the following SQL statements will list departments and the highest salary of employees within each department?\*\*

- A) `SELECT department\_id, MAX(salary) FROM Employees;`

- B) `SELECT department\_id, salary FROM Employees WHERE salary = (SELECT MAX(salary) FROM Employees);`

- C) `SELECT department\_id, MAX(salary) FROM Employees GROUP BY department\_id;`

- D) `SELECT department\_id, salary FROM Employees GROUP BY department\_id;`

- \*\*Answer:\*\* C

12. \*\*What will the following SQL query return? `SELECT e1.EmployeeID FROM Employees e1 WHERE e1.salary > (SELECT AVG(e2.salary) FROM Employees e2 WHERE e2.department\_id = e1.department\_id);`\*\*

- A) Employees whose salary is higher than the average salary across all departments.

- B) Employees whose salary is higher than the average salary of their department.

- C) Employees whose salary is lower than the average salary across all departments.

- D) Employees with the highest salary in each department.

- \*\*Answer:\*\* B

13. \*\*Which SQL function can be used to get the difference between maximum and minimum values within a group in a single query?\*\*

- A) `MIN()` and `MAX()`

- B) `DIFFERENCE()`

- C) `MINUS()`

- D) `(MAX() - MIN())`

- \*\*Answer:\*\* D

14. \*\*In an SQL database, what does the following query return? `SELECT Department, COUNT(EmployeeID) AS EmployeeCount FROM Employees GROUP BY Department HAVING EmployeeCount = (SELECT MAX(EmployeeCount) FROM (SELECT Department, COUNT(EmployeeID) AS EmployeeCount FROM Employees GROUP BY Department) AS DeptCounts);`\*\*

- A) Departments with fewer than the maximum number of employees.

- B) Departments with the maximum number of employees.

- C) All departments.

- D) The department with the lowest number of employees.

- \*\*Answer:\*\* B

15. \*\*Which SQL clause is necessary when using aggregate functions but filtering only after grouping?\*\*

- A) WHERE

- B) ORDER BY

- C) GROUP BY

- D) HAVING

- \*\*Answer:\*\* D

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