IT 313 - ADVANCE DATABASE SYSTEM

1. What does "DBMS" stand for?

a. Data Binding Management System

b. Database Management System

c. Data Backup Management System

d. Database Binary System

2. Which SQL statement is used to view the execution plan for a query?

a. PLAN

b. EXPLAIN

c. PROFILE

d. ANALYZE

3. Which term refers to the process of verifying a user’s identity before allowing access to a database?

a. Encryption

b. Authorization

c. Authentication

d. Hashing

4. Which SQL query can be used to retrieve employees who earn more than the average salary?

a. SELECT Name FROM Employees WHERE Salary < (SELECT AVG(Salary) FROM Employees);

b. SELECT Name FROM Employees WHERE Salary = (SELECT MAX(Salary) FROM Employees);

c. SELECT Name FROM Employees WHERE Salary > (SELECT AVG(Salary) FROM Employees);

d. SELECT Name FROM Employees WHERE Salary < (SELECT MIN(Salary) FROM Employees);

5. What is the purpose of query optimization in a database system?

a. To store data in multiple formats

b. To improve the efficiency of data retrieval

c. To allow parallel processing of queries

d. To enforce data integrity constraints

6. Which index type is best suited for equality searches?

a. B-tree index

b. Bitmap index

c. Hash index

d. Full-text index

7. Which SQL operation is used to combine data from two tables based on a related column?

a. Subquery

b. JOIN

c. Window Function

d. Aggregate Function

8. Which query should be refactored to improve performance if frequent searches on ProductName are slowing down the system?

a. SELECT \* FROM Products WHERE ProductID = 1001;

b. SELECT \* FROM Products WHERE ProductName = 'Laptop';

c. SELECT \* FROM Products WHERE Price > 500;

d. SELECT \* FROM Products ORDER BY Category;

9. In a banking system, which security mechanism ensures that only authorized users can access sensitive data?

a. Role-based access control

b. Full-text search

c. Foreign key constraints

d. Data normalization

10. Which constraint ensures that no two rows in a table can have the same value for a specified column?

a. Primary Key

b. Foreign Key

c. Unique

d. Check

11. What is the result of the following SQL query:

SELECT Name, Salary FROM Employees WHERE Salary > 50000;

a. It retrieves the names and salaries of employees who earn exactly $50,000.

b. It retrieves the names and salaries of employees who earn less than $50,000.

c. It retrieves the names and salaries of employees who earn more than $50,000.

d. It retrieves the names and salaries of all employees.

12. In a database with foreign keys, what happens when a referenced row is deleted?

a. Nothing happens.

b. The foreign key is automatically removed.

c. Referential integrity is violated unless cascading is used.

d. The primary key is deleted.

13. What would an INNER JOIN return if there are no matching rows between the two tables?

a. All rows from both tables.

b. No rows.

c. All rows from the first table.

d. All rows from the second table.

14. Which SQL function is used to rank rows in a result set?

a. SUM()

b. COUNT()

c. RANK()

d. MAX()

15. Which SQL keyword is used to group rows that have the same values in specified columns?

a. GROUP BY

b. ORDER BY

c. WHERE

d. DISTINCT

16. What does an execution plan show for a SQL query?

a. The sequence of operations performed by the database to execute the query

b. A list of all tables in the database

c. A summary of the query results

d. The number of users accessing the database

17. Why would a full table scan occur despite having an index on a column?

a. The column is not part of the WHERE clause

b. The index is on a different column

c. The index is outdated

d. The table is too small for the index to be used

18. In which situation would a composite index be most effective?

a. When queries filter or sort based on two or more columns

b. When each query filters based on a single column

c. When tables contain only a small number of rows

d. When using queries without WHERE clauses

19. How can query profiling help with query optimization?

a. By storing frequently used queries

b. By identifying bottlenecks in query execution

c. By changing the database schema automatically

d. By creating temporary indexes for each query

20. Which of the following is a potential drawback of using too many indexes?

a. Queries become faster

b. Inserts, updates, and deletes become slower

c. Queries will fail

d. The database stops storing data

21. How can an execution plan help in deciding whether an index should be added?

a. It lists all the available indexes in the database

b. It shows whether a query is scanning the entire table

c. It checks if the database is full

d. It displays query results in a different order

22. Why is encryption important for data in transit?

a. To optimize query execution

b. To ensure data is unreadable by unauthorized parties during transmission

c. To speed up data transmission over the network

d. To allow multiple users to access the same data

23. What is the difference between encryption at rest and encryption in transit?

a. Encryption at rest protects stored data, while encryption in transit protects data moving between systems

b. Encryption at rest is faster than encryption in transit

c. Encryption in transit applies to inactive data, while encryption at rest applies to active data

d. Encryption at rest uses TLS, while encryption in transit uses AES

24. Which encryption algorithm is most commonly used to protect data at rest?

a. MD5

b. RSA

c. AES

d. DES

25. What does role-based access control (RBAC) regulate in a database?

a. Which users can execute specific queries

b. The size of the database tables

c. How many queries a user can run simultaneously

d. Which encryption algorithm to use for user passwords

26. Which technique best ensures that a person’s identity is hidden when analyzing sensitive datasets?

a. Normalization

b. Data anonymization

c. Query optimization

d. Referential integrity

27. Why might multi-factor authentication be used in a high-security database?

a. To prevent SQL injection attacks

b. To add an extra layer of security beyond passwords

c. To ensure data integrity during transactions

d. To allow faster data access for authorized users

28. What is the purpose of a CHECK constraint in a database?

a. To ensure that foreign keys are correct.

b. To limit the values that can be placed in a column.

c. To automatically remove records when a referenced record is deleted.

d. To prevent NULL values in a column.

29. How does a NoSQL database differ from a relational database?

a. It has a fixed schema.

b. It is not suitable for large datasets.

c. It uses a flexible schema and can handle unstructured data.

d. It only supports the document store model.

30. Which scenario would benefit most from using a window function in SQL?

a. Calculating the total salary for a department.

b. Ranking employees within departments based on salary.

c. Joining two tables together.

d. Removing duplicate rows.

31. Which statement about primary and foreign keys is correct?

a. A foreign key must always reference a primary key in the same table.

b. A primary key ensures the uniqueness of each row in a table.

c. A primary key can contain NULL values.

d. A foreign key ensures the uniqueness of each row in a table.

32. Why would you use a LEFT JOIN in SQL?

a. To return only rows where there is a match between the tables.

b. To return all rows from both tables.

c. To return all rows from the left table, even if there are no matches in the right table.

d. To return all rows from the right table, even if there are no matches in the left table.

33. Which integrity constraint would you apply to a column that must always contain unique values?

a. CHECK

b. NOT NULL

c. PRIMARY KEY

d. UNIQUE

34. When would you prefer a materialized view over a regular view?

a. When the query results need to be updated frequently

b. When the query results change very infrequently

c. When you need a faster INSERT operation

d. When you need dynamic real-time query results

35. What is the best way to optimize a query that frequently aggregates sales data for a report?

a. Create an index on the sales table

b. Use a materialized view to precompute the aggregated results

c. Use a hash index for faster lookup

d. Increase the size of the sales table

36. Why is it important to analyze query execution plans regularly?

a. To check for SQL syntax errors

b. To ensure that indexes are being used efficiently

c. To create new tables based on the queries

d. To delete unnecessary queries

37. Which technique should be used if a query frequently performs a join but only on a small portion of a table?

a. Full table scan

b. Creating a composite index

c. Partitioning the table

d. Using a hash join

38. When would you use the EXPLAIN command in SQL?

a. To display query results

b. To generate an execution plan for a query

c. To update indexes in a table

d. To create new views

39. What is a potential downside to using a materialized view in a frequently updated database?

a. The view may become outdated quickly

b. The view may run queries slower

c. The view will delete old data automatically

d. The view cannot store results permanently

40. In which situation would a company likely need to delete a customer’s personal information from the database?

a. The customer’s account is inactive for a month

b. The customer requests deletion under GDPR

c. The customer’s data is encrypted at rest

d. The company updates its database schema

41. Which of the following is a disadvantage of using encryption for all data in a database?

a. Encryption can slow down query performance for large datasets

b. Encryption prevents the use of role-based access control

c. Encryption makes data integrity checks impossible

d. Encryption eliminates the need for user authentication

42. What is a likely reason for implementing pseudonymization in a healthcare database?

a. To permanently delete sensitive patient data

b. To allow access to patient records without revealing personal details

c. To make data available for marketing purposes

d. To speed up the encryption process for the database

43. Which approach best balances data privacy and usability in research databases?

a. Storing all personal data in plaintext for research

b. Implementing differential privacy to protect sensitive data while still allowing analysis

c. Disabling encryption to speed up queries

d. Allowing full access to all data for authorized users

44. How can an organization ensure compliance with data protection regulations when managing sensitive customer data?

a. Encrypting all data with the same key

b. Implementing encryption, access controls, and regular audits

c. Allowing all employees access to encrypted data

d. Deleting all customer data after one year

45. Why would differential privacy be applied to a database containing personal information?

a. To guarantee the accuracy of the stored data

b. To add noise to the data and protect individual privacy

c. To enhance data retrieval performance

d. To enable unencrypted data transfer over a network

46-50. Using SQL, create a table called Books with the following fields: BookID, Title, Author, PublishedYear, and Genre. Make BookID the primary key.