

Oracle Database – Interview Answers

1. Difference between a Database and an Instance in Oracle

In Oracle architecture, a database refers to the physical storage of data. It includes data files, control files, and redo log files stored on disk. An instance consists of memory structures (SGA) and background processes such as DBWR, LGWR, SMON, and PMON that manage access to the database. A database can be accessed by multiple instances in RAC, while an instance exists only while the database is open.

2. SQL Query Tuning for Performance

SQL tuning improves query efficiency in large databases. It involves analyzing execution plans using EXPLAIN PLAN or DBMS_XPLAN, optimizing indexes to support joins and filters, gathering optimizer statistics using DBMS_STATS, and rewriting queries to avoid SELECT *, reduce subqueries, and filter data early. These steps reduce CPU usage, I/O, and execution time.

3. Difference between TRUNCATE and DELETE

DELETE is a DML command that removes rows one by one, can use a WHERE clause, generates undo, fires triggers, and can be rolled back. TRUNCATE is a DDL command that removes all rows instantly, cannot be rolled back, does not fire triggers, and resets the high-water mark, making it faster.

4. Changing NOARCHIVELOG to ARCHIVELOG Mode

To enable ARCHIVELOG mode: shut down the database, start it in MOUNT mode, execute ALTER DATABASE ARCHIVELOG, then open the database. Verify using ARCHIVE LOG LIST. ARCHIVELOG mode enables online backups and point-in-time recovery.

5. Difference between UNIQUE and PRIMARY KEY

A PRIMARY KEY uniquely identifies each row, does not allow NULL values, and only one primary key is allowed per table. A UNIQUE constraint enforces uniqueness but allows NULL values and multiple UNIQUE constraints can exist on a table.

6. Index and B-tree Index Explanation

An index is a database object that improves data retrieval speed. A B-tree index stores values in a balanced tree structure consisting of root, branch, and leaf blocks. Oracle uses B-tree indexes for equality and range searches to minimize disk I/O.

7. Handling Database Deadlocks

A deadlock occurs when transactions wait indefinitely for each other. Oracle automatically detects deadlocks and rolls back one transaction. Deadlocks can be minimized by keeping transactions short, accessing tables in a consistent order, and using proper indexing.

8. Components of Physical and Logical Data Models

A logical data model includes entities, attributes, relationships, and constraints representing business requirements. A physical data model includes tables, columns, indexes, data types, partitions, and storage details specific to the database.

9. Tablespace and Its Role

A tablespace is a logical storage unit that groups related database objects and consists of one or more data files. Tablespaces help manage storage, improve performance, and support backup and recovery strategies.

10. User Connectivity in Oracle Database

User connectivity involves the Oracle Listener, client tools, and server processes. The client sends a connection request, the listener receives and validates it, assigns a server process, and establishes a user session for SQL execution.