Oracle Concepts and Architecture
Database Structures

1. What are the components of physical database structure of Oracle database?
Oracle database is comprised of three types of files. One or more datafiles, two are more redo log files, and one or more control files.

2. What are the components of logical database structure of Oracle database?
There are tablespaces and database's schema objects.

3. What is a tablespace?
A database is divided into Logical Storage Unit called tablespaces. A tablespace is used to grouped related logical structures together.

4. What is SYSTEM tablespace and when is it created?
Every Oracle database contains a tablespace named SYSTEM, which is automatically created when the database is created. The SYSTEM tablespace always contains the data dictionary tables for the entire database.

5. Explain the relationship among database, tablespace and data file.
Each databases logically divided into one or more tablespaces one or more data files are explicitly created for each tablespace.

6. What is schema?
A schema is collection of database objects of a user.

7. What are Schema Objects?
Schema objects are the logical structures that directly refer to the database's data. Schema objects include tables, views, sequences, synonyms, indexes, clusters, database triggers, procedures, functions packages and database links.

8. Can objects of the same schema reside in different table spaces?
Yes.

9. Can a tablespace hold objects from different schemes?
Yes.

10. What is Oracle table?
A table is the basic unit of data storage in an Oracle database. The tables of a database hold all of the user accessible data. Table data is stored in rows and columns.

11. What is an Oracle view?
A view is a virtual table. Every view has a query attached to it. (The query is a SELECT statement that identifies the columns and rows of the table(s) the view uses.)

12. Do a view contain data?
Views do not contain or store data.

13. Can a view based on another view?
Yes.

14. What are the advantages of views?
- Provide an additional level of table security, by restricting access to a predetermined set of rows and columns of a table.
- Hide data complexity.
- Simplify commands for the user.
- Present the data in a different perspective from that of the base table.
- Store complex queries.

15. What is an Oracle sequence?
A sequence generates a serial list of unique numbers for numerical columns of a database's tables.

16. What is a synonym?
A synonym is an alias for a table, view, sequence or program unit.

17. What are the types of synonyms?
There are two types of synonyms private and public.

18. What is a private synonym?
Only its owner can access a private synonym.

19. What is a public synonym?
Any database user can access a public synonym.

20. What are synonyms used for?
- Mask the real name and owner of an object.
- Provide public access to an object
- Provide location transparency for tables, views or program units of a remote database.
- Simplify the SQL statements for database users.

21. What is an Oracle index?
An index is an optional structure associated with a table to have direct access to rows, which can be created to increase the performance of data retrieval. Index can be created on one or more columns of a table.

22. How are the index updates?
Indexes are automatically maintained and used by Oracle. Changes to table data are automatically incorporated into all relevant indexes.

23. What are clusters?
Clusters are groups of one or more tables physically stores together to share common columns and are often used together.

24. What is cluster key?
The related columns of the tables in a cluster are called the cluster key.

25. What is index cluster?
A cluster with an index on the cluster key.

26. What is hash cluster?

A row is stored in a hash cluster based on the result of applying a hash function to the row's cluster key value. All rows with the same hash key value are stores together on disk.

27. When can hash cluster used?
Hash clusters are better choice when a table is often queried with equality queries. For such queries the specified cluster key value is hashed. The resulting hash key value points directly to the area on disk that stores the specified rows.

28. What is database link?
A database link is a named object that describes a "path" from one database to another.

29. What are the types of database links?
Private database link, public database link & network database link.

30. What is private database link?
Private database link is created on behalf of a specific user. A private database link can be used only when the owner of the link specifies a global object name in a SQL statement or in the definition of the owner's views or procedures.

31. What is public database link?
Public database link is created for the special user group PUBLIC. A public database link can be used when any user in the associated database specifies a global object name in a SQL statement or object definition.

32. What is network database link?
Network database link is created and managed by a network domain service. A network database link can be used when any user of any database in the network specifies a global object name in a SQL statement or object definition.

33. What is data block?
Oracle database's data is stored in data blocks. One data block corresponds to a specific number of bytes of physical database space on disk.

34. How to define data block size?
A data block size is specified for each Oracle database when the database is created. A database users and allocated free database space in Oracle data blocks. Block size is specified in init.ora file and cannot be changed latter.

35. What is row chaining?
In circumstances, all of the data for a row in a table may not be able to fit in the same data block. When this occurs, the data for the row is stored in a chain of data block (one or more) reserved for that segment.

36. What is an extent?
An extent is a specific number of contiguous data blocks, obtained in a single allocation and used to store a specific type of information.

37. What is a segment?
A segment is a set of extents allocated for a certain logical structure.

38. What are the different types of segments?

Data segment, index segment, rollback segment and temporary segment.

39. What is a data segment?
Each non-clustered table has a data segment. All of the table's data is stored in the extents of its data segment. Each cluster has a data segment. The data of every table in the cluster is stored in the cluster's data segment.

40. What is an index segment?
Each index has an index segment that stores all of its data.

41. What is rollback segment?
A database contains one or more rollback segments to temporarily store "undo" information.

42. What are the uses of rollback segment?
To generate read-consistent database information during database recovery and to rollback uncommitted transactions by the users.

43. What is a temporary segment?
Temporary segments are created by Oracle when a SQL statement needs a temporary work area to complete execution. When the statement finishes execution, the temporary segment extents are released to the system for future use.

44. What is a datafile?
Every Oracle database has one or more physical data files. A database's data files contain all the database data. The data of logical database structures such as tables and indexes is physically stored in the data files allocated for a database.

45. What are the characteristics of data files?
A data file can be associated with only one database. Once created a data file can't change size. One or more data files form a logical unit of database storage called a tablespace.

46. What is a redo log?
The set of redo log files for a database is collectively known as the database redo log.

47. What is the function of redo log?
The primary function of the redo log is to record all changes made to data.

48. What is the use of redo log information?
The information in a redo log file is used only to recover the database from a system or media failure prevents database data from being written to a database's data files.

49. What does a control file contains?
- Database name
- Names and locations of a database's files and redolog files.
- Time stamp of database creation.

50. What is the use of control file?
When an instance of an Oracle database is started, its control file is used to identify the database and redo log files that must be opened for database operation to proceed. It is also used in database recovery.

Data Base Administration

51. What is a database instance? Explain.
A database instance (Server) is a set of memory structure and background processes that access a set of database files. The processes can be shared by all of the users.

The memory structure that is used to store the most queried data from database. This helps up to improve database performance by decreasing the amount of I/O performed against data file.

52. What is Parallel Server?
Multiple instances accessing the same database (only in multi-CPU environments)

53. What is a schema?
The set of objects owned by user account is called the schema.

54. What is an index? How it is implemented in Oracle database?
An index is a database structure used by the server to have direct access of a row in a table. An index is automatically created when a unique of primary key constraint clause is specified in create table command

55. What are clusters?
Group of tables physically stored together because they share common columns and are often used together is called cluster.

56. What is a cluster key?
The related columns of the tables are called the cluster key. The cluster key is indexed using a cluster index and its value is stored only once for multiple tables in the cluster.

57. What is the basic element of base configuration of an Oracle database?
It consists of
       one or more data files.
       one or more control files.
       two or more redo log files.
The Database contains
       multiple users/schemas
    one or more rollback segments
       one or more tablespaces
       Data dictionary tables
       User objects (table,indexes,views etc.,)
The server that access the database consists of
       SGA (Database buffer, Dictionary Cache Buffers, Redo log buffers, Shared SQL pool)
       SMON (System MONito)
       PMON (Process MONitor)
       LGWR (LoG Write)
       DBWR (Data Base Write)
       ARCH (ARCHiver)
       CKPT (Check Point)
       RECO
       Dispatcher
       User Process with associated PGS

58. What is a deadlock? Explain.
Two processes waiting to update the rows of a table, which are locked by other processes then deadlock arises.

In a database environment this will often happen because of not issuing the proper row lock commands. Poor design of front-end application may cause this situation and the performance of server will reduce drastically.

These locks will be released automatically when a commit/rollback operation performed or any one of this processes being killed externally.

Memory Management

59. What is SGA?
The System Global Area in an Oracle database is the area in memory to facilitate the transfer of information between users. It holds the most recently requested structural information between users. It holds the most recently requested structural information about the database. The structure is database buffers, dictionary cache, redo log buffer and shared pool area.

60. What is a shared pool?
The data dictionary cache is stored in an area in SGA called the shared pool. This will allow sharing of parsed SQL statements among concurrent users.

61. What is mean by Program Global Area (PGA)?
It is area in memory that is used by a single Oracle user process.

62. What is a data segment?
Data segment are the physical areas within a database block in which the data associated with tables and clusters are stored.

63. What are the factors causing the reparsing of SQL statements in SGA?
Due to insufficient shared pool size.
Monitor the ratio of the reloads takes place while executing SQL statements. If the ratio is greater than 1 then increase the SHARED_POOL_SIZE.

Database Logical & Physical Architecture

64. What is Database Buffers?
Database buffers are cache in the SGA used to hold the data blocks that are read from the data segments in the database such as tables, indexes and clusters
DB_BLOCK_BUFFERS parameter in INIT.ORA decides the size.

65. What is dictionary cache?
Dictionary cache is information about the database objects stored in a data dictionary table.

66. What is meant by recursive hints?
Number of times processes repeatedly query the dictionary table is called recursive hints. It is due to the data dictionary cache is too small. By increasing the SHARED_POOL_SIZE parameter we can optimize the size of data dictionary cache.

67. What is redo log buffer?
Changes made to the records are written to the on-line redo log files. So that they can be used in roll forward operations during database recoveries. Before writing them into the redo log files, they will first brought to redo log buffers in SGA and LGWR will write into files frequently. LOG_BUFFER parameter will decide the size.

68. How will you swap objects into a different table space for an existing database?
- Export the user
- Perform import using the command imp system/manager file=export.dmp indexfile=newrite.sql. This will create all definitions into newfile.sql.
- Drop necessary objects.
- Run the script newfile.sql after altering the tablespaces.
- Import from the backup for the necessary objects.

69. List the Optional Flexible Architecture (OFA) of Oracle database? How can we organize the tablespaces in Oracle database to have maximum performance?
SYSTEM - Data dictionary tables.
DATA - Standard operational tables.
DATA2- Static tables used for standard operations
INDEXES - Indexes for Standard operational tables.
INDEXES1 - Indexes of static tables used for standard operations.
TOOLS - Tools table.
TOOLS1 - Indexes for tools table.
RBS - Standard Operations Rollback Segments,
RBS1,RBS2 - Additional/Special Rollback segments.
TEMP - Temporary purpose tablespace
TEMP_USER - Temporary tablespace for users.
USERS - User tablespace.

70. How will you force database to use particular rollback segment?
SET TRANSACTION USE ROLLBACK SEGMENT rbs_name.

71. What is meant by free extent?
A free extent is a collection of continuous free blocks in tablespace. When a segment is dropped its extents are reallocated and are marked as free.

72.Which parameter in Storage clause will reduce number of rows per block?
PCTFREE parameter
Row size also reduces no of rows per block.

73. What is the significance of having storage clause?
We can plan the storage for a table as how much initial extents are required, how much can be extended next, how much % should leave free for managing row updating, etc.,

74. How does Space allocation table place within a block?
Each block contains entries as follows
Fixed block header
Variable block header
Row Header, row date (multiple rows may exists)
PCTEREE (% of free space for row updating in future)

75. What is the role of PCTFREE parameter is storage clause?
This is used to reserve certain amount of space in a block for expansion of rows.

76. What is the OPTIMAL parameter?
It is used to set the optimal length of a rollback segment.

77. What is the functionality of SYSTEM table space?
To manage the database level transactions such as modifications of the data dictionary table that record information about the free space usage.

78. How will you create multiple rollback segments in a database?
- Create a database, which implicitly creates a SYSTEM rollback segment in a SYSTEM tablespace.
- Create a second rollback segment name R0 in the SYSTEM tablespace.
- Make new rollback segment available (after shutdown, modify init.ora file and start database)
- Create other tablespaces (RBS) for rollback segments.
- Deactivate rollback segment R0 and activate the newly created rollback segments.

79. How the space utilization takes place within rollback segments?
It will try to fit the transaction in a cyclic fashion to all existing extents. Once it found an extent is in use then it forced to acquire a new extent (number of extents is based on the optimal size)

80. Why query fails sometimes?
Rollback segment dynamically extent to handle larger transactions entry loads.
A single transaction may wipeout all available free space in the rollback segment tablespace. This prevents other user using rollback segments.

81. How will you monitor the space allocation?
By querying DBA_SEGMENT table/view

82. How will you monitor rollback segment status?
Querying the DBA_ROLLBACK_SEGS view

IN USE	- Rollback Segment is on-line.
AVAILABLE	- Rollback Segment available but not on-line.
OFF-LINE	- Rollback Segment off-line.
INVALID	- Rollback Segment Dropped.
NEEDS RECOVERY	- Contains data but need recovery or corrupted.
PARTLY AVAILABLE	- Contains data from an unresolved transaction involving a distributed database.

83. List the sequence of events when a large transaction that exceeds beyond its optimal value when an entry wraps and causes the rollback segment to expand into another extend.
Transaction Begins.
An entry is made in the RES header for new transactions entry
Transaction acquires blocks in an extent of RBS
The entry attempts to wrap into second extent. None is available, so that the RBS must extent.
The RBS checks to see if it is part of its OPTIMAL size.

RBS chooses its oldest inactive segment.
Oldest inactive segment is eliminated.
RBS extents
The data dictionary tables for space management are updated.
Transaction Completes.

84. How can we plan storage for very large tables?
Limit the number of extents in the table
Separate table from its indexes.
Allocate sufficient temporary storage.

85. How will you estimate the space required by a non-clustered table?
Calculate the total header size
Calculate the available data space per data block
Calculate the combined column lengths of the average row
Calculate the total average row size.
Calculate the average number rows that can fit in a block
Calculate the number of blocks and bytes required for the table.
After arriving the calculation, add 10 % additional space to calculate the initial extent size for a working table.

86. It is possible to use raw devices as data files and what are the advantages over file system files?
Yes.
The advantages over file system files are that I/O will be improved because Oracle is bye-passing the kernel which writing into disk. Disk corruption will be very less.

87. What is a Control file?
Database's overall physical architecture is maintained in a file called control file. It will be used to maintain internal consistency and guide recovery operations. Multiple copies of control files are advisable.

88. How to implement the multiple control files for an existing database?
Shutdown the database
Copy one of the existing control file to new location
Edit Config ora file by adding new control filename
Restart the database.

89. What is redo log file mirroring? How can be achieved?
Process of having a copy of redo log files is called mirroring.
This can be achieved by creating group of log files together, so that LGWR will automatically writes them to all the members of the current on-line redo log group. If any one group fails then database automatically switch over to next group. It degrades performance.

90. What is advantage of having disk shadowing / mirroring?
Shadow set of disks save as a backup in the event of disk failure. In most operating systems if any disk failure occurs it automatically switchover to place of failed disk. Improved performance because most OS support volume shadowing can direct file I/O request to use the shadow set of files instead of the main set of files. This reduces I/O load on the main set of disks.

91. What is use of rollback segments in Oracle database?
They allow the database to maintain read consistency between multiple transactions.

92. What is a rollback segment entry?
It is the set of before image data blocks that contain rows that are modified by a transaction.
Each rollback segment entry must be completed within one rollback segment.
A single rollback segment can have multiple rollback segment entries.

93. What is hit ratio?
It is a measure of well the data cache buffer is handling requests for data.
Hit Ratio = (Logical Reads - Physical Reads - Hits Misses)/ Logical Reads.

94. When will be a segment released?
When Segment is dropped.
When Shrink (RBS only)
When truncated (TRUNCATE used with drop storage option)

95. What are disadvantages of having raw devices?
We should depend on export/import utility for backup/recovery (fully reliable)
The tar command cannot be used for physical file backup, instead we can use dd command, which is less flexible and has limited recoveries.

96. List the factors that can affect the accuracy of the estimations?
- The space used transaction entries and deleted records, does not become free immediately after completion due to delayed cleanout.
- Trailing nulls and length bytes are not stored.
- Inserts of, updates to and deletes of rows as well as columns larger than a single data block, can cause fragmentation a chained row pieces.

Database Security & Administration

97. What is user Account in Oracle database?
A user account is not a physical structure in database but it is having important relationship to the objects in the database and will be having certain privileges.

98. How will you enforce security using stored procedures?
Don't grant user access directly to tables within the application.
Instead grant the ability to access the procedures that access the tables.
When procedure executed it will execute the privilege of procedures owner. Users cannot access tables except via the procedure.

99. What are the dictionary tables used to monitor a database space?

DBA_FREE_SPACE
DBA_SEGMENTS
DBA_DATA_FILES.

SQL*Plus Statements

100. What are the types of SQL statement?

Data Definition Language: CREATE, ALTER, DROP, TRUNCATE, REVOKE, NO AUDIT & COMMIT.
Data Manipulation Language: INSERT, UPDATE, DELETE, LOCK TABLE, EXPLAIN PLAN & SELECT.
Transactional Control: COMMIT & ROLLBACK
Session Control: ALTERSESSION & SET ROLE
System Control: ALTER SYSTEM.

101. What is a transaction?
Transaction is logical unit between two commits and commit and rollback.

102. What is difference between TRUNCATE & DELETE?
TRUNCATE commits after deleting entire table i.e., cannot be rolled back.
Database triggers do not fire on TRUNCATE
DELETE allows the filtered deletion. Deleted records can be rolled back or committed.
Database triggers fire on DELETE.

103. What is a join? Explain the different types of joins?
Join is a query, which retrieves related columns or rows from multiple tables.
Self Join - Joining the table with itself.
Equi Join - Joining two tables by equating two common columns.
Non-Equi Join - Joining two tables by equating two common columns.
Outer Join - Joining two tables in such a way that query can also retrieve rows that do not have corresponding join value in the other table.

104. What is the sub-query?
Sub-query is a query whose return values are used in filtering conditions of the main query.

105. What is correlated sub-query?
Correlated sub-query is a sub-query, which has reference to the main query.

106. Explain CONNECT BY PRIOR?
Retrieves rows in hierarchical order eg.
select empno, ename from emp where.

107. Difference between SUBSTR and INSTR?

INSTR (String1, String2 (n, (m)),
INSTR returns the position of the m-th occurrence of the string 2 in string1. The search begins from nth position of string1.

SUBSTR (String1 n, m)
SUBSTR returns a character string of size m in string1, starting from n-th position of string1.

108. Explain UNION, MINUS, UNION ALL and INTERSECT?
INTERSECT   - returns all distinct rows selected by both queries.
MINUS   - returns all distinct rows selected by the first query but not by the second.
UNION   - returns all distinct rows selected by either query

UNION ALL   - returns all rows selected by either query, including all duplicates.

109. What is ROWID?
ROWID is a pseudo column attached to each row of a table. It is 18 characters long, blockno, rownumber are the components of ROWID.

110. What is the fastest way of accessing a row in a table?

Using ROWID.
CONSTRAINTS

111. What is an integrity constraint?
Integrity constraint is a rule that restricts values to a column in a table.

112. What is referential integrity constraint?
Maintaining data integrity through a set of rules that restrict the values of one or more columns of the tables based on the values of primary key or unique key of the referenced table.

113. What is the usage of SAVEPOINTS?
SAVEPOINTS are used to subdivide a transaction into smaller parts. It enables rolling back part of a transaction. Maximum of five save points are allowed.

114. What is ON DELETE CASCADE?
When ON DELETE CASCADE is specified Oracle maintains referential integrity by automatically removing dependent foreign key values if a referenced primary or unique key value is removed.

115. What are the data types allowed in a table?
CHAR, VARCHAR2, NUMBER, DATE, RAW, LONG and LONG RAW.

116. What is difference between CHAR and VARCHAR2? What is the maximum SIZE allowed for each type?

CHAR pads blank spaces to the maximum length.
VARCHAR2 does not pad blank spaces.
For CHAR the maximum length is 255 and 2000 for VARCHAR2.

117. How many LONG columns are allowed in a table? Is it possible to use LONG columns in WHERE clause or ORDER BY?
Only one LONG column is allowed. It is not possible to use LONG column in WHERE or ORDER BY clause.

118. What are the pre-requisites to modify datatype of a column and to add a column with NOT NULL constraint?
 - To modify the datatype of a column the column must be empty.
 - To add a column with NOT NULL constrain, the table must be empty.

119. Where the integrity constraints are stored in data dictionary?
The integrity constraints are stored in USER_CONSTRAINTS.

120. How will you activate/deactivate integrity constraints?

The integrity constraints can be enabled or disabled by ALTER TABLE ENABLE CONSTRAINT / DISABLE CONSTRAINT.

121. If unique key constraint on DATE column is created, will it validate the rows that are inserted with SYSDATE?
It won't, Because SYSDATE format contains time attached with it.

122. What is a database link?
Database link is a named path through which a remote database can be accessed.

123. How to access the current value and next value from a sequence? Is it possible to access the current value in a session before accessing next value?
Sequence name CURRVAL, sequence name NEXTVAL. It is not possible. Only if you access next value in the session, current value can be accessed.

124. What is CYCLE/NO CYCLE in a Sequence?
CYCLE specifies that the sequence continue to generate values after reaching either maximum or minimum value. After pan-ascending sequence reaches its maximum value, it generates its minimum value. After a descending sequence reaches its minimum, it generates its maximum.

NO CYCLE specifies that the sequence cannot generate more values after reaching its maximum or minimum value.

125. What are the advantages of VIEW?
- To protect some of the columns of a table from other users.
- To hide complexity of a query.
- To hide complexity of calculations.

126. Can a view be updated/inserted/deleted? If Yes - under what conditions?
A View can be updated/deleted/inserted if it has only one base table if the view is based on columns from one or more tables then insert, update and delete is not possible.

127. If a view on a single base table is manipulated will the changes be reflected on the base table?
If changes are made to the tables and these tables are the base tables of a view, then the changes will be reference on the view.

Oracle Interview Questions and Answers: SQL

1.   **To see current user name** → SQL> show user;

2.   **Change SQL prompt name** → SQL> set sqlprompt "Manimara > "

3.   **Switch to DOS prompt** → SQL> host

4.   **How do I eliminate the duplicate rows ?**
 SQL> delete from table_name where rowid not in (select max(rowid) from table group by duplicate_values_field_name);
or

SQL> delete duplicate_values_field_name dv from table_name ta
where rowid <(select min(rowid) from table_name tb where
ta.dv=tb.dv);
Example.
Table Emp
Empno Ename
101   Scott
102   Jiyo
103   Millor
104   Jiyo
105   Smith
delete ename from emp a where rowid < (select min(rowid) from emp
b where a.ename = b.ename);
The output like,
Empno Ename
101   Scott
102   Millor
103   Jiyo
104   Smith

5.   How do I display row number with records?
To achive this use rownum pseudocolumn with query, like
SQL> select rownum, ename from emp;
Output:
1   Scott
2   Millor
3   Jiyo
4   Smith

6.   Display the records between two range
select rownum, empno, ename from emp where rowid in
 (select rowid from emp where rownum <=&upto
 minus
 select rowid from emp where rownum<&Start);
Enter value for upto: 10
Enter value for Start: 7

   ROWNUM   EMPNO ENAME
--------- --------- ----------
        1   7782 CLARK
        2   7788 SCOTT
        3   7839 KING
        4   7844 TURNER

7.   I know the nvl function only allows the same data type(ie. number or char or date Nvl(comm, 0)), if commission is null then the text "Not Applicable" want to display, instead of blank space. How do I write the query?

 SQL> select nvl(to_char(comm.),'NA') from emp;

Output :

NVL(TO_CHAR(COMM),'NA')

NA
300
500
NA
1400
NA
NA

8.   Oracle cursor : Implicit & Explicit cursors
Oracle uses work areas called private SQL areas to create SQL statements.
PL/SQL construct to identify each and every work are used, is called as Cursor.
For SQL queries returning a single row, PL/SQL declares all implicit cursors.
For queries that returning more than one row, the cursor needs to be explicitly declared.

9.   Explicit Cursor attributes
 There are four cursor attributes used in Oracle
cursor_name%Found, cursor_name%NOTFOUND,
cursor_name%ROWCOUNT, cursor_name%ISOPEN

10. Implicit Cursor attributes
 Same as explicit cursor but prefixed by the word SQL

SQL%Found, SQL%NOTFOUND, SQL%ROWCOUNT, SQL%ISOPEN

Tips : 1. Here SQL%ISOPEN is false, because oracle automatically closed the implicit cursor after executing SQL statements.
      : 2. All are Boolean attributes.

11. Find out nth highest salary from emp table
 SELECT DISTINCT (a.sal) FROM EMP A WHERE &N = (SELECT COUNT (DISTINCT (b.sal)) FROM EMP B WHERE a.sal<=b.sal);

Enter value for n: 2
    SAL

    3700

12. To view installed Oracle version information
 SQL> select banner from v$version;

13. Display the number value in Words
 SQL> select sal, (to_char(to_date(sal,'j'), 'jsp'))

from emp;
the output like,

```
    SAL (TO_CHAR(TO_DATE(SAL,'J'),'JSP'))
--------- ------------------------------------------------------
    800 eight hundred
   1600 one thousand six hundred
   1250 one thousand two hundred fifty
```
If you want to add some text like,
Rs. Three Thousand only.
SQL> select sal "Salary ",
 (' Rs. '|| (to_char(to_date(sal,'j'), 'Jsp'))|| ' only.'))
 "Sal in Words" from emp
/
```
Salary  Sal in Words
------- ------------------------------------------------------
   800  Rs. Eight Hundred only.
  1600  Rs. One Thousand Six Hundred only.
  1250  Rs. One Thousand Two Hundred Fifty only.
```

14. Display Odd/ Even number of records
 Odd number of records:
select * from emp where (rowid,1) in (select rowid, mod(rownum,2) from emp);
1
3
5
Even number of records:
select * from emp where (rowid,0) in (select rowid, mod(rownum,2) from emp)
2
4
6

15. Which date function returns number value?
 months_between

16. Any three PL/SQL Exceptions?
 Too_many_rows, No_Data_Found, Value_Error, Zero_Error, Others

17. What are PL/SQL Cursor Exceptions?
 Cursor_Already_Open, Invalid_Cursor

18. Other way to replace query result null value with a text
 SQL> Set NULL 'N/A'
to reset SQL> Set NULL ''

19.   What are the more common pseudo-columns?
 SYSDATE, USER , UID, CURVAL, NEXTVAL, ROWID, ROWNUM

20.   What is the output of SIGN function?
 1 for positive value,
0 for Zero,
-1 for Negative value.

21. What is the maximum number of triggers, can apply to a single table?
 12 triggers.

1. **Which of the following statements is true about implicit cursors?**
   1. Implicit cursors are used for SQL statements that are not named.
   2. Developers should use implicit cursors with great care.
   3. Implicit cursors are used in cursor for loops to handle data processing.
   4. Implicit cursors are no longer a feature in Oracle.
2. **Which of the following is not a feature of a cursor FOR loop?**
   1. Record type declaration.
   2. Opening and parsing of SQL statements.
   3. Fetches records from cursor.
   4. Requires exit condition to be defined.
3. **A developer would like to use referential datatype declaration on a variable. The variable name is EMPLOYEE_LASTNAME, and the corresponding table and column is EMPLOYEE, and LNAME, respectively. How would the developer define this variable using referential datatypes?**
   1. Use employee.lname%type.
   2. Use employee.lname%rowtype.
   3. Look up datatype for EMPLOYEE column on LASTNAME table and use that.
   4. Declare it to be type LONG.
4. **Which three of the following are implicit cursor attributes?**
   1. %found
   2. %too_many_rows
   3. %notfound
   4. %rowcount
   5. %rowtype
5. **If left out, which of the following would cause an infinite loop to occur in a simple loop?**
   1. LOOP
   2. END LOOP
   3. IF-THEN
   4. EXIT
6. **Which line in the following statement will produce an error?**
   1. cursor action_cursor is
   2. select name, rate, action
   3. into action_record
   4. from action_table;
   5. There are no errors in this statement.
7. **The command used to open a CURSOR FOR loop is**
   1. open
   2. fetch
   3. parse
   4. None, cursor for loops handle cursor opening implicitly.
8. **What happens when rows are found using a FETCH statement**
   1. It causes the cursor to close
   2. It causes the cursor to open
   3. It loads the current row values into variables
   4. It creates the variables to hold the current row values
9. Read the following code:
   10. CREATE OR REPLACE PROCEDURE find_cpt

11. (v_movie_id {Argument Mode} NUMBER, v_cost_per_ticket {argument mode} NUMBER)
12. IS
13. BEGIN
14.   IF v_cost_per_ticket > 8.5 THEN
15. SELECT cost_per_ticket
16. INTO   v_cost_per_ticket
17. FROM   gross_receipt
18. WHERE   movie_id = v_movie_id;
19.   END IF;
20. END;

Which mode should be used for V_COST_PER_TICKET?

1. IN
2. OUT
3. RETURN
4. IN OUT

21. Read the following code:
    22. CREATE OR REPLACE TRIGGER update_show_gross
    23.   {trigger information}
    24.   BEGIN
    25.   {additional code}
    26.   END;

The trigger code should only execute when the column, COST_PER_TICKET, is greater than $3. **Which trigger information will you add?**

1. WHEN (new.cost_per_ticket > 3.75)
2. WHEN (:new.cost_per_ticket > 3.75
3. WHERE (new.cost_per_ticket > 3.75)
4. WHERE (:new.cost_per_ticket > 3.75)

27. **What is the maximum number of handlers processed before the PL/SQL block is exited when an exception occurs?**
    1. Only one
    2. All that apply
    3. All referenced
    4. None

28. **For which trigger timing can you reference the NEW and OLD qualifiers?**
    1. Statement and Row
    2. Statement only
    3. Row only
    4. Oracle Forms trigger

29. Read the following code:
    30. CREATE OR REPLACE FUNCTION get_budget(v_studio_id IN NUMBER)
        RETURN number IS

        v_yearly_budget NUMBER;

        BEGIN
            SELECT yearly_budget
            INTO   v_yearly_budget
            FROM   studio
            WHERE   id = v_studio_id;

```
            RETURN v_yearly_budget;
        END;
```
Which set of statements will successfully invoke this function within SQL*Plus?

1. VARIABLE g_yearly_budget NUMBER
   EXECUTE g_yearly_budget := GET_BUDGET(11);
2. VARIABLE g_yearly_budget NUMBER
   EXECUTE :g_yearly_budget := GET_BUDGET(11);
3. VARIABLE :g_yearly_budget NUMBER
   EXECUTE :g_yearly_budget := GET_BUDGET(11);
4. VARIABLE g_yearly_budget NUMBER
   :g_yearly_budget := GET_BUDGET(11);

31. CREATE OR REPLACE PROCEDURE update_theater
32. (v_name IN VARCHAR v_theater_id IN NUMBER) IS
33. BEGIN
34.   UPDATE theater
35.   SET   name = v_name
36.   WHERE   id = v_theater_id;
37. END update_theater;

38. **When invoking this procedure, you encounter the error:**

ORA-000: Unique constraint(SCOTT.THEATER_NAME_UK) violated.
How should you modify the function to handle this error?

1. An user defined exception must be declared and associated with the error code and handled in the EXCEPTION section.
2. Handle the error in EXCEPTION section by referencing the error code directly.
3. Handle the error in the EXCEPTION section by referencing the UNIQUE_ERROR predefined exception.
4. Check for success by checking the value of SQL%FOUND immediately after the UPDATE statement.

39. Read the following code:
40. CREATE OR REPLACE PROCEDURE calculate_budget IS
41. v_budget   studio.yearly_budget%TYPE;
42. BEGIN
43.   v_budget := get_budget(11);
44.   IF v_budget < 30000
45.   THEN
46.   set_budget(11,30000000);
47.   END IF;
48. END;

You are about to add an argument to CALCULATE_BUDGET. What effect will this have?

1. The GET_BUDGET function will be marked invalid and must be recompiled before the next execution.
2. The SET_BUDGET function will be marked invalid and must be recompiled before the next execution.
3. Only the CALCULATE_BUDGET procedure needs to be recompiled.
4. All three procedures are marked invalid and must be recompiled.

49. **Which procedure can be used to create a customized error message?**

1. RAISE_ERROR
2. SQLERRM
3. RAISE_APPLICATION_ERROR
4. RAISE_SERVER_ERROR

50. **The CHECK_THEATER trigger of the THEATER table has been disabled. Which command can you issue to enable this trigger?**
    1. ALTER TRIGGER check_theater ENABLE;
    2. ENABLE TRIGGER check_theater;
    3. ALTER TABLE check_theater ENABLE check_theater;
    4. ENABLE check_theater;

51. **Examine this database trigger**
    ```
    52. CREATE OR REPLACE TRIGGER prevent_gross_modification
    53. {additional trigger information}
    54. BEGIN
    55.     IF TO_CHAR(sysdate, DY) = MON
    56.     THEN
    57.     RAISE_APPLICATION_ERROR(-20000,Gross receipts cannot be
        deleted on Monday);
    58.     END IF;
    59. END;
    ```

    This trigger must fire before each DELETE of the GROSS_RECEIPT table. It should fire only once for the entire DELETE statement. What additional information must you add?

    1. BEFORE DELETE ON gross_receipt
    2. AFTER DELETE ON gross_receipt
    3. BEFORE (gross_receipt DELETE)
    4. FOR EACH ROW DELETED FROM gross_receipt

60. **Examine this function:**
    ```
    61. CREATE OR REPLACE FUNCTION set_budget
    62. (v_studio_id IN NUMBER, v_new_budget IN NUMBER) IS
    63. BEGIN
    64.     UPDATE  studio
    65.     SET         yearly_budget = v_new_budget
            WHERE   id = v_studio_id;

            IF SQL%FOUND THEN
                RETURN TRUEl;
            ELSE
                RETURN FALSE;
            END IF;


            COMMIT;
        END;
    ```
    Which code must be added to successfully compile this function?

    1. Add RETURN right before the IS keyword.
    2. Add RETURN number right before the IS keyword.
    3. Add RETURN boolean right after the IS keyword.
    4. Add RETURN boolean right before the IS keyword.

66. **Under which circumstance must you recompile the package body after recompiling the package specification?**

1. Altering the argument list of one of the package constructs
2. Any change made to one of the package constructs
3. Any SQL statement change made to one of the package constructs
4. Removing a local variable from the DECLARE section of one of the package constructs

67. **Procedure and Functions are explicitly executed. This is different from a database trigger. When is a database trigger executed?**
   1. When the transaction is committed
   2. During the data manipulation statement
   3. When an Oracle supplied package references the trigger
   4. During a data manipulation statement and when the transaction is committed

68. **Which Oracle supplied package can you use to output values and messages from database triggers, stored procedures and functions within SQL*Plus?**
   1. DBMS_DISPLAY
   2. DBMS_OUTPUT
   3. DBMS_LIST
   4. DBMS_DESCRIBE

69. **What occurs if a procedure or function terminates with failure without being handled?**
   1. Any DML statements issued by the construct are still pending and can be committed or rolled back.
   2. Any DML statements issued by the construct are committed
   3. Unless a GOTO statement is used to continue processing within the BEGIN section, the construct terminates.
   4. The construct rolls back any DML statements issued and returns the unhandled exception to the calling environment.

70. **Examine this code**
   71. BEGIN
   72.   theater_pck.v_total_seats_sold_overall := theater_pck.get_total_for_year;
   73. END;

   For this code to be successful, what must be true?

   1. Both the V_TOTAL_SEATS_SOLD_OVERALL variable and the GET_TOTAL_FOR_YEAR function must exist only in the body of the THEATER_PCK package.
   2. Only the GET_TOTAL_FOR_YEAR variable must exist in the specification of the THEATER_PCK package.
   3. Only the V_TOTAL_SEATS_SOLD_OVERALL variable must exist in the specification of the THEATER_PCK package.
   4. Both the V_TOTAL_SEATS_SOLD_OVERALL variable and the GET_TOTAL_FOR_YEAR function must exist in the specification of the THEATER_PCK package.

74. **A stored function must return a value based on conditions that are determined at runtime. Therefore, the SELECT statement cannot be hard-coded and must be created dynamically when the function is executed. Which Oracle supplied package will enable this feature?**
   1. DBMS_DDL
   2. DBMS_DML
   3. DBMS_SYN
   4. DBMS_SQL

1. What is a Cartesian product? What causes it?

Expected answer:

A Cartesian product is the result of an unrestricted join of two or more tables. The result set of a three table Cartesian product will have x * y * z number of rows where x, y, z correspond to the number of rows in each table involved in the join. It is causes by specifying a table in the FROM clause without joining it to another table.

2. What is an advantage to using a stored procedure as opposed to passing an SQL query from an application.

Expected answer:

A stored procedure is pre-loaded in memory for faster execution. It allows the DBMS control of permissions for security purposes. It also eliminates the need to recompile components when minor changes occur to the database.

3. What is the difference of a LEFT JOIN and an INNER JOIN statement?

Expected answer:

A LEFT JOIN will take ALL values from the first declared table and matching values from the second declared table based on the column the join has been declared on. An INNER JOIN will take only matching values from both tables

4. When a query is sent to the database and an index is not being used, what type of execution is taking place?

Expected answer:

A table scans.

5. What are the pros and cons of using triggers?

Expected answer:

A trigger is one or more statements of SQL that are being executed in event of data modification in a table to which the trigger belongs. Triggers enhance the security, efficiency, and standardization of databases.

Triggers can be beneficial when used:

– to check or modify values before they are actually updated or inserted in the database. This is useful if you need to transform data from the way the user sees it to some internal database format.

– to run other non-database operations coded in user-defined functions

– to update data in other tables. This is useful for maintaining relationships between data or in keeping audit trail information.

– To check against other data in the table or in other tables. This is useful to ensure data integrity when referential integrity constraints aren't appropriate, or when table check constraints limit checking to the current table only.