DBMS VIVA QUESTIONS

1. What is database?
A database is a logically coherent collection of data with some inherent meaning, representing some aspect of real world and which is designed, built and populated with data for a specific purpose.

2. What is DBMS?
It is a collection of programs that enables user to create and maintain a database. In other words it is general-purpose software that provides the users with the processes of defining, constructing and manipulating the database for various applications.

3. What is a Database system?
The database and DBMS software together is called as Database system.

4. What are the advantages of DBMS?
1. Redundancy is controlled.
2. Unauthorised access is restricted.
3. Providing multiple user interfaces.
4. Enforcing integrity constraints.
5. Providing backup and recovery.

5. What are the disadvantage in File Processing System?
1. Data redundancy and inconsistency.
2. Difficult in accessing data.
3. Data isolation.
4. Data integrity.
5. Concurrent access is not possible.
6. Security Problems.

6. Describe the three levels of data abstraction?
1. **Physical level:** The lowest level of abstraction describes how data are stored.
2. **Logical level:** The next higher level of abstraction, describes what data are stored in database and what relationship among those data.
3. **View level:** The highest level of abstraction describes only part of entire database.
They are three levels of abstraction:

7. Define the "integrity rules"?
1. **Entity Integrity:** States that "Primary key cannot have NULL value"
2. **Referential Integrity:** States that "Foreign Key can be either a NULL value or should be Primary Key value of other relation.
There are two Integrity rules.

8. What is Data Independence?
Data independence means that "the application is independent of the storage structure and access strategy of data". In other words, The ability to modify the schema definition in one level should not affect the schema definition in the next higher level.
Two types of Data Independence:
1. **Physical Data Independence:** Modification in physical level should not affect the logical level.
2. **Logical Data Independence:** Modification in logical level should affect the view level.
NOTE: Logical Data Independence is more difficult to achieve

9. What is a view? How it is related to data independence?
A view may be thought of as a virtual table, that is, a table that does not really exist in its own right but is instead derived from one or more underlying base table. In other words, there is no stored file that direct represents the view instead a definition of view is stored in data dictionary.

Growth and restructuring of base tables is not reflected in views. Thus the view can insulate users from the effects of restructuring and growth in the database. Hence accounts for logical data independence.

10. What is Data Model?
A collection of conceptual tools for describing data, data relationships data semantics and constraints.

11. What is E-R model?
This data model is based on real world that consists of basic objects called entities and of relationship among these objects. Entities are described in a database by a set of attributes.

12. What is Object Oriented model?
This model is based on collection of objects. An object contains values stored in instance variables with in the object. An object also contains bodies of code that operate on the object. These bodies of code are called methods. Objects that contain same types of values and the same methods are grouped together into classes.

13. What is an Entity?
It is a 'thing' in the real world with an independent existence.

14. What is an Entity type?
It is a collection (set) of entities that have same attributes.

15. What is an Entity set?
It is a collection of all entities of particular entity type in the database.

16. What is an Extension of entity type?
The collections of entities of a particular entity type are grouped together into an entity set.

17. What is Weak Entity set?
An entity set may not have sufficient attributes to form a primary key, and its primary key compromises of its partial key and primary key of its parent entity, then it is said to be Weak Entity set.

18. What is an attribute?
It is a particular property, which describes the entity.

19. What is a Relation Schema and a Relation?
A relation Schema denoted by R(A1, A2, ..., An) is made up of the relation name R and the list of attributes Ai that it contains. A relation is defined as a set of tuples. Let r be the relation which contains set tuples (t1, t2, t3, ..., tn). Each tuple is an ordered list of n-values t=(v1,v2, ..., vn).

20. What is degree of a Relation?
It is the number of attribute of its relation schema.

21. What is Relationship?
It is an association among two or more entities.

22. What is Relationship set?
The collection (or set) of similar relationships.

23. What is Relationship type?
Relationship type defines a set of associations or a relationship set among a given set of entity types.

24. What is degree of Relationship type?
It is the number of entity type participating.

25. What is DDL (Data Definition Language)?
A data base schema is specifies by a set of definitions expressed by a special language called DDL.

26. What is DML (Data Manipulation Language)?
This language that enable user to access or manipulate data as organised by appropriate data model.
1. **Procedural DML or Low level:** DML requires a user to specify what data are needed and how to get those data.
2. **Non-Procedural DML or High level:** DML requires a user to specify what data are needed without specifying how to get those data.

27. What is Query evaluation engine?
It executes low-level instruction generated by compiler.

28. What is normalization?
It is a process of analysing the given relation schemas based on their Functional Dependencies (FDs) and primary key to achieve the properties
(1).Minimizing redundancy, (2). Minimizing insertion, deletion and update anomalies.

29. What is Functional Dependency?
A Functional dependency is denoted by X Y between two sets of attributes X and Y that are subsets of R specifies a constraint on the possible tuple that can form a relation state r of R. The constraint is for any two tuples t1 and t2 in r if t1[X] = t2[X] then they have t1[Y] = t2[Y]. This means the value of X component of a tuple uniquely determines the value of component Y.

30. What is Lossless join property?
It guarantees that the spurious tuple generation does not occur with respect to relation schemas after decomposition.

31. What is 1 NF (Normal Form)?
The domain of attribute must include only atomic (simple, indivisible) values.

32. What is Fully Functional dependency?
It is based on concept of full functional dependency. A functional dependency X Y is full functional dependency if removal of any attribute A from X means that the dependency does not hold any more.

33. What is 2NF?
A relation schema R is in 2NF if it is in 1NF and every non-prime attribute A in R is fully functionally dependent on primary key.

34. What is 3NF?
A relation schema R is in 3NF if it is in 2NF and for every FD X A either of the following is true
1. X is a Super-key of R.
2. A is a prime attribute of R.
In other words, if every non prime attribute is non-transitively dependent on primary key.

35. What is BCNF (Boyce-Codd Normal Form)?
A relation schema R is in BCNF if it is in 3NF and satisfies an additional constraint that for every FD X A, X must be a candidate key.

36. What is meant by query optimization?
The phase that identifies an efficient execution plan for evaluating a query that has the least estimated cost is referred to as query optimization.

37. What is durability in DBMS?
Once the DBMS informs the user that a transaction has successfully completed, its effects should persist even if the system crashes before all its changes are reflected on disk. This property is called durability.

38. What do you mean by atomicity and aggregation? 1. **Atomicity:** Either all actions are carried out or none are. Users should not have to worry about the effect of incomplete transactions. DBMS ensures this by undoing the actions of incomplete transactions.

2. **Aggregation:** A concept which is used to model a relationship between a collection of entities and relationships. It is used when we need to express a relationship among relationships.

39. What is a query?
A query with respect to DBMS relates to user commands that are used to interact with a data base. The query language can be classified into data definition language and data manipulation language.

40. What do you mean by Correlated subquery?
Subqueries, or nested queries, are used to bring back a set of rows to be used by the parent query. Depending on how the subquery is written, it can be executed once for the parent query or it can be
executed once for each row returned by the parent query. If the subquery is executed for each row of the parent, this is called a correlated subquery.
A correlated subquery can be easily identified if it contains any references to the parent subquery columns in its WHERE clause. Columns from the subquery cannot be referenced anywhere else in the parent query. The following example demonstrates a non-correlated subquery.
Example: SELECT * FROM CUST WHERE '10/03/1990' IN (SELECT ODATE FROM ORDER WHERE CUST.CNUM = ORDER.CNUM)

41. What are the primitive operations common to all record management systems?
Addition, deletion and modification.

42. What are the unary operations in Relational Algebra?
PROJECTION and SELECTION.

43. Are the resulting relations of PRODUCT and JOIN operation the same?
No.
PRODUCT: Concatenation of every row in one relation with every row in another.
JOIN: Concatenation of rows from one relation and related rows from another.

44. Which part of the RDBMS takes care of the data dictionary? How?
Data dictionary is a set of tables and database objects that is stored in a special area of the database and maintained exclusively by the kernel.

45. What is the job of the information stored in data-dictionary?
The information in the data dictionary validates the existence of the objects, provides access to them, and maps the actual physical storage location.

46. How do you communicate with an RDBMS?
You communicate with an RDBMS using Structured Query Language (SQL).

47. Define SQL and state the differences between SQL and other conventional programming Languages.
SQL is a nonprocedural language that is designed specifically for data access operations on normalized relational database structures. The primary difference between SQL and other conventional programming languages is that SQL statements specify what data operations should be performed rather than how to perform them.

48. Name the three major set of files on disk that compose a database in Oracle.
There are three major sets of files on disk that compose a database. All the files are binary. These are
1.) Database files
2.) Control files
3.) Redo logs
The most important of these are the database files where the actual data resides. The control files and the redo logs support the functioning of the architecture itself. All three sets of files must be

present, open, and available to Oracle for any data on the database to be useable. Without these files, you cannot access the database, and the database administrator might have to recover some or all of the database using a backup, if there is one.

49. What is database Trigger?
A database trigger is a PL/SQL block that can defined to automatically execute for insert, update, and delete statements against a table. The trigger can e defined to execute once for the entire statement or once for every row that is inserted, updated, or deleted. For any one table, there are twelve events for which you can define database triggers. A database trigger can call database procedures that are also written in PL/SQL.

50. What is Transaction Manager?
It is a program module, which ensures that database, remains in a consistent state despite system failures and concurrent transaction execution proceeds without conflicting.

51. What is File Manager?
It is a program module, which manages the allocation of space on disk storage and data structure used to represent information stored on a disk.

52. What is Authorization and Integrity manager?
It is the program module, which tests for the satisfaction of integrity constraint and checks the authority of user to access data.

53. What are stand-alone procedures?
Procedures that are not part of a package are known as stand-alone because they independently defined. These types of procedures are not available for reference from other Oracle tools. Another limitation of stand-alone procedures is that they are compiled at run time, which slows execution.

54. What are cursors give different types of cursors?
PL/SQL uses cursors for all database information accesses statements. The language supports the use two types of cursors
1.) Implicit
2.) Explicit

55. What is a foreign key, and what is it used for?
A foreign key is used to establish relationships among relations in the relational model. Technically, a foreign key is a column (or columns) appearing in one relation that is (are) the primary key of another table. Although there may be exceptions, the values in the foreign key columns usually must correspond to values existing in the set of primary key values. This correspondence requirement is created in a database using a referential integrity constraint on the foreign key.

56. What is an SQL subquery?
An SQL subquery is a means of querying two or more tables at the same time. The subquery itself is an SQL SELECT statement contained within the WHERE clause of another SQL SELECT statement, and separated by being enclosed in parenthesis. Some subqueries have equivalent SQL join structures, but correlated subqueries cannot be duplicated by a join..

57. Why are functional dependencies not equations?
Equations deal with numerical relationships. A functional dependency deals with the existence of a determinant relationship between attributes, regardless of whether or not there is a numerical relationship between them. Thus, if we know that there is no hot water every Wednesday, No-Hot-Water is functionally dependent on Wednesday. So, if we know it is Wednesday, then we know we will have No-Hot-Water. This is a functional dependency, but not an equation.

58. Name and describe three types of binary relationships.
1:1 - a single entity instance of one type is related to a single-entity instance of another type.
1:N - a single entity instance of one type is related to many-entity instances of another type.
M:N - many-entity instances of one type relate to many-entity instances of another type.

59. What is a SQL view? Briefly explain the use of views.
A SQL view is a virtual table built from other tables or views. Views are used to (1) hide columns or rows, (2) show the results of computed columns, (3) hide complicated SQL syntax, (4) layer built-in functions, (5) provide a level of indirection between application programs and tables, (6) assign different sets of processing permissions to tables, and (7) to assign different sets of triggers to the same table.

60. Name four applications for triggers.
(1) providing default values, (2) enforcing data constraints, (3) updating views and (4) enforcing referential integrity

61. What are stored procedures, and how do they differ from triggers?
A stored procedure is a program that is stored within the database and is compiled when used. They can receive input parameters and they can return results. Unlike triggers, their scope is database-wide; they can be used by any process that has permission to use the database stored procedure.

62. What are the advantages of using stored procedures?
The advantages of stored procedures are (1) greater security, (2) decreased network traffic, (3) the fact that SQL can be optimized and (4) code sharing which leads to less work, standardized processing, and specialization among developers.

63. What is the difference between a correlated subquery and a regular subquery?
A correlated subquery appears deceptively similar to a regular subquery. The difference is that a regular subquery can be processed from the bottom up. In a regular subquery, results from the lowest query can be determined and used to evaluate the upper-level query. In contrast, in a correlated subquery, the processing is nested; that is, a row from an upper query statement is used in comparison with rows in a lower level query. The key distinction of a correlated subquery is that the lower-level select statements use columns from upper-level statements.

64. Explain the difference between an exclusive lock and a shared lock.
An exclusive lock prohibits other users from reading the locked resource; a shared lock allows other users to read the locked resource, but they cannot update it.
Optimistic locking assumes no transaction conflict will occur and deals with the consequences if it does. Pessimistic locking assumes that conflict will occur and so prevents it ahead of time with locks. In general, optimistic locking is preferred for the Internet and for many intranet applications.

65. What is deadlock? How can it be avoided? How can it be resolved once it occurs?
Deadlock occurs when two transactions are each waiting on a resource that the other transaction holds. Deadlock can be prevented by requiring transactions to acquire all locks at the same time; once it occurs, the only way to cure it is to abort one of the transactions and back out of partially completed work.

66. Explain what we mean by an ACID transaction.
An ACID transaction is one that is atomic, consistent, isolated, and durable. Durable means that database changes are permanent. Consistency can mean either statement level or transaction level consistency. With transaction level consistency, a transaction may not see its own changes. There are four transaction isolation levels: read committed, read uncommitted, repeatable read and serialization. Atomic means it is performed as a unit.

67. What is NoSQL?
NoSQL encompasses a wide variety of different database technologies that were developed in response to a rise in the volume of data stored about users, objects and products. The frequency in which this data is accessed, and performance and processing needs. Relational databases, on the other hand, were not designed to cope with the scale and agility challenges that face modern applications, nor were they built to take advantage of the cheap storage and processing power available today

68.What are the features of NoSQL?
When compared to relational databases, NoSQL databases are more scalable and provide superior performance, and their data model addresses several issues that the relational model is not designed to address: Large volumes of structured, semi-structured, and unstructured data Agile sprints, quick iteration, and frequent code pushes Object-oriented programming that is easy to use and flexible Efficient, scale-out architecture instead of expensive, monolithic architecture.

69. What is the difference between primary key and candidate key?
Every row of a table is identified uniquely by primary key. There is only one primary key for a table. Primary Key is also a candidate key. By common convention, candidate key can be designated as primary and which can be used for any foreign key references.

70. What is a foreign key?
A foreign key is one table which can be related to the primary key of another table. Relationship needs to be created between two tables by referencing foreign key with the primary key of another table.