1 Mark Questions

1. Define data and information.

Data is a raw and unorganized fact that required to be processed to make it meaningful. Information is a set of data which is processed in a meaningful way according to the given requirement. Information is processed, structured, or presented in a given context to make it meaningful and useful.

2.Define DBMS.

A database management system (DBMS) is a software package designed to define, manipulate, retrieve and manage data in a database.

3.What is data independence?

Data independence refers characteristic of being able to modify the schema at one level of the database system without altering the schema at the next higher level. There are two types of data independence: Logical Data Independence and Physical Data Independence.

4.What is data model?

A data model is a collection of concepts that can be used to describe the conceptual/logical structure of a database

5.List relational algebra operations.

The fundamental operations of relational algebra are as follows −

* Select
* Project
* Union
* Set different
* Cartesian product
* Rename

6.What is view?

In SQL, a view is a virtual table based on the result-set of an SQL statement. A view contains rows and columns, just like a real table. The fields in a view are fields from one or more real tables in the database.

7.What is super key?

A superkey is a set of attributes within a relation whose values can be used to uniquely identify a tuple.

8.What is redundancy?

Redundancy means having multiple copies of same data in the database. This problem arises when a database is not normalized.

9.Define database catalog?

Database catalog contains a complete definition or description of the database structure and constraints. The information stored in the catalog is called meta-data.The catalog is used by the DBMS software and also by database users who need information about the database structure.

10.What is the difference between a database schema and a database state?

A database schema or an intention describes the organization and structure of data in a database system, along with the relationships mapped between the entities. This can be considered as a blueprint of a database. Database state is data in the database at a particular instance of time.

11.Differentiate total and partial participation constraints?

Total Participation requires each entity in the entity set must participate in the relationship whereas for Partial Participation, the entity in the entity set may or may not participate in the relationship.

12.Define relation schema and degree of a relation?

Relation schema is the logical definition of a relation. This includes a set of attributes, the data types associated with each attribute. Relational schema may also refer to as database schema. Degree of a relation specifies the total number of attributes in the relation.

13.What is relational algebra expression?

Relational algebra expression is a procedural language query, which takes instances of relations as input and yields instances of relations as output.

14.Define virtual table in SQL?

A view or virtual table in SQL is a single table that is derived from base tables or previously defined views. A view does not necessarily exist in physical form.

15.What is functional dependency?

A functional dependency is a constraint between two sets of attributes from the database. A functional dependency, denoted by *X* →*Y*, between two sets of attributes *X* and *Y* specifies a *constraint* on the possible tuples of relation state *r* of *R*. The constraint is that, for any two tuples *t*1 and *t*2 in *r* that have *t*1[*X*] = *t*2[*X*], they must also have *t*1[*Y*] = *t*2[*Y*].

16.What is database?

A database is a collection of related data. data, means known facts that can be recorded and that have implicit meaning.

17.What are the advantages of DBMS?

* Controlling Redundancy
* Restricting Unauthorized Access
* Providing Persistent Storage for Program Objects
* Providing Storage Structures and Search Techniques for Efficient Query Processing
* Providing Backup and Recovery
* Providing Multiple User Interfaces
* Enforcing Integrity Constraints
* Permitting Inferencing and Actions Using Rules

18.Describe the three levels of data abstraction?

* Internal Level: Actual PHYSICAL storage structure and access paths.
* Conceptual or Logical Level: Structure and constraints for the entire database.
* External or View level: Describes various user views.

19.Define the integrity rules?

Integrity rules are the conditions to be satisfied by the database so as to guarantee validity of the data. They are needed to inform the DBMS about certain constraints in the real world.

20.What is E-R model?

*The*Entity Relationship model*defines the conceptual* view of a database. It works around real-world entities and the associations among them.

21.What is data manipulation Language?

DML is a Database language that is used for performing data insertion, modification, deletion and selection operations on a database.

22.What is lossless join property?

It is a desirable property of decomposition. According to lossless join property, when a relation is decomposed into a set of sub-relations and when the sub-relations are joined back, the resulting relation should be same as the original relation. It ensures that no spurious tuples are generated when a NATURAL JOIN operation is applied to the sub-relations.

23.Define schema and instance?

Schema is the formal description of the structure of database whereas Instance is the set of information currently stored in a database at a specific time.

24.Define entities and entities set?

Entity is a real world object that exists either physically or conceptually. An entity set is a set of entities of the same type

25.Define cadinality and arity of a relation?

Cardinality of a relation is the number of tuples in a relation state. The degree (or arity) of a relation is the number of attributes *n* of its relation schema.

26.Write the set operations

In relation algebra following are the set operations.union, intersection, difference and cartesian product

27.What is week entity list?

Entity type that do not have key attributes of its own is called weak entity type. Set of entities of same weak entity type forms weak entity set/list

28.What is DDL & DML?

DBMS provides Data Definition Language(DDL) for defining the database, i.e., creating tables, altering the definition of existing table, dropping a table etc.

Data Manipulation Language is used for performing insert, delete, update and select operations on a database.

29.What is primary key?

Primary key is the candidate key whose values are used to *identify* tuples in the relation.

30.Define relationship and relationship set?

Relationship defines association among entities of different entity types. Relationship set *R* is a set of relationship instances *ri,* where each *ri* associates *n* individual entities.

31.Define foreign key?

A set of attributes FK in relation schema *R*1 is a foreign key of *R*1 that references relation *R*2 if it satisfies the following rules:

1. The attributes in FK have the same domain(s) as the primary key attributes PK of *R*2
2. A value of FK in a tuple *t*1 of the current state *r*1(*R*1) either occurs as a value of PK for some tuple *t*2 in the current state *r*2(*R*2) *or is NULL*.

32.Define DRC?

Domain relational calculus (DRC) is a declarative database query language for the relational data model.

1. Write DDL commands?

* CREATE – Used for defining a database object
* ALTER - Used for changing the definition of a database object
* DROP – Used for deleting a database object
* TRUNCATE – Used for deleting the records in a database table

33.Define sub-query?

A subquery is a SELECT statement that is embedded in a clause of another SELECT statement. That other select statement/query is called the outer query

34.Define entity type and attribute.

Attributes are the particular properties of an entity that describe it. For example, an EMPLOYEE entity may be described by the employee’s name, age, address, salary, and job. An entity typedefines a *collection* (or *set*) of entities that have the same attributes. Each entity type in the database is described by its name and attributes.

35.What are relational model constrains?

Various restrictions on data that can be specified on a relational database are called relational model constraints. They can be divided into three main categories:

* inherent model-based constraints or implicit constraints
* schema-based constraints or explicit constraints
* application-based or semantic constraints

36.Explain multi-valued dependencies.

If we have two or more multivalued *independent* attributes in the same relation schema, we get into a problem of having to repeat every value of one of the attributes with every value of the other attribute to keep the relation state consistent and to maintain the independence among the attributes involved. This constraint is specified by a multivalued dependency

37.What is physical data independence?

Capacity of database system to alter physical schema without having to alter conceptual/external schema

38.What is fully functional dependency?

An attribute is fully functional dependent on another attribute, if it is Functionally Dependent on that attribute and not on any of its proper subset.

39.List the primitive operations common to all database management systems.

Any database management system should allow the following primitive operations:

* Database creation
* Database Updation (This includes Insertion, deletion and modification operations)
* Database Lookup

40.Given an example of non-procedural language.

SQL, TRC and DRC are non-procedural languages.

41.Write the two DCL commands.

Commit – makes the changes made to database permanent

rollback – undo the recent updations made to the database

42.How schemas are defined in the three tier architecture?

The goal of the three-schema architecture, is to separate the user applications from the physical database. In this architecture, schemas can be defined at the following three levels:

1. The external or view level includes a number of external schemas or user views. Each external schema describes the part of the database that a particular user group is interested in and hides the rest of the database from that user group.
2. The conceptual level (logical schema) has a conceptual schema, which describes the structure of the whole database for a community of users.

The internal level (physical schema) has an internal schema, which describes the physical storage structure of the database

43.Give examples of weak entity set and strong entity set?

Employee entity type has a key attribute (Employee number) of its own. So it is a strong entity type and set of employee entities forms strong entity set. While dependent entity type doesnot has a key attribute of its own. Dependent entities. are to be related to employee entities in order to get identified. Hence, set of dependent entities form weak entity set.

44.What are the rules for writing formulas in tuple relational calculus?

*Rule 1*: Every atom is a formula.

*Rule 2*: If *F*1 and *F*2 are formulas, then so are (*F*1 AND *F*2), (*F*1 OR *F*2), NOT (*F*1), and NOT (*F*2).

*Rule 3*: If *F* is a formula, then so is (∃*t*)(*F*), where *t* is a tuple variable.

*Rule 4*: If *F* is a formula, then so is (∀*t*)(*F*), where *t* is a tuple variable

45.Write SQL command for creating views.

CREATE VIEW *view\_name* AS  
SELECT *column1*, *column2*,…   
FROM *table\_name*  
WHERE *condition*;

46.State dependency preservation property.

Each functional dependency *X*🡪*Y* specified in *F* either appeared directly in one of the relation schemas *Ri* in the decomposition *D* or could be inferred from the dependencies that appear in some *Ri*.

47.Define partial functional dependency.

A functional dependency *X 🡪* *Y* is a partial dependency if some attribute *A* belonging to *X* can be removed from *X* and the dependency still holds; that is, for some *A* belongs to *X*, (*X* – {*A*}) 🡪*Y*. For ex, the dependency {Ssn, Pnumber}🡪Ename is partial because Ssn→Ename holds.

1. Differentiate between primary key and unique key.

A primary key cannot have NULL values, while unique key can have NULL values. A table can have at most one primary key, while it can have more than one unique keys.

48.What is embedded SQL?

SQL statements can be embedded in a procedural language program for combining data manipulation capabilities of SQL and computing power of any programming language. This is called embedded SQL

49.What are the different entity types?

Strong entity type – Entity type that has its own key attribute for uniquely identifying an entity.

Weak Rntity Type - Entity type that doesn’t has its own key attribute for identifying an entity.

50.Explain unary relational operations.

Relational operation that operates on a single relation is called unary relational operation. For example, Select and Project operations of Relation Algebra are unary operations.

51.What are additional relational operations?

Some common database requests cannot be performed with the original relational algebra operations. Additional operations can express these requests. These

operations enhance the expressive power of the original relational algebra. Following are the additional relational algebra operations:

* Generalized Projection
* Aggregate Functions and Grouping
* Recursive Closure Operations
* Outer Join Operations
* Outer union Operation

52.Write the syntax of INSERT query.

INSERT INTO <table name> [ ( <column name> { , <column name> } ) ]  
( VALUES ( <constant value> , { <constant value> } ) { , ( <constant value> { , <constant value> } ) } | <select statement> )

53.What are the database security issues?

* legal and ethical issues regarding the right to access certain information
* Policy issues at the governmental, institutional, or corporate level as to what kinds of information should not be made publicly available.
* System-related issues such as the system levels at which various security functions should be enforced
* The need in some organizations to identify multiple *security levels* and to categorize the data and users based on these classifications

54.What is query?

A query is a request for data or information from a database. Query can be specified on a database by using various query languages. SQL is one such query language.

55.What the syntax of delete statement.

DELETE FROM <table name> [ WHERE <selection condition> ]

56.Define null values.

Null (or NULL) is a special marker used in SQL to indicate that a data value does not exist in the database. It represents missing or inapplicable

57.List the actors on the scene in DBMS.

* Database Administrators
* Database Designers
* End Users
* System Analysts and Application Programmers

58.Define data model and list its types.

High-level/ Conceptual Data Model

Implementation/Representation Data Model

Physical Data Model.

59.State any five good heuristic strategies that are used in query optimization.

1. Break up any SELECT operations with conjunctive conditions into a cascade of SELECT operations.
2. Move each SELECT operation as far down the query tree as is permitted by the attributes involved in the select condition.
3. Combine a CARTESIAN PRODUCT operation with a subse- quent SELECT operation in the tree into a JOIN operation, if the condition represents a join condition.
4. Break down and move lists of projection attributes down the tree as far as possible by creating new PROJECT operations as needed.
5. Identify subtrees that represent groups of operations that can be executed by a single algorithm.

60.State the advantages of views.

Using Views, user's access to the entire content of table can be restricted by allowing accessing only Views with only required columns of the table. Views eliminate the need to write the complex query.

61.What is an SQL query block? Describe how a query block is translated into extended relational algebra.

SQL queries are decomposed into *query blocks,* which form the basic units that can be translated into the algebraic operators and optimized. A query block contains a single SELECT-FROM-WHERE expression, as well as GROUP BY and HAVING clauses if these are part of the block. Hence, nested queries within a query are identified as separate query blocks.

An SQL query is first translated into an equivalent extended relational algebra expression—represented as a query tree data structure—that is then optimized. The *query optimizer* would then choose an execution plan for each query block.

62.What restrictions are necessary to ensure that view is updatable?

View should be defined on a single table without any aggregate functions. It should not involve any joins.

63.State the differences between super key and primary key.

A Super Key is simply a non-minimal Candidate Key, that is to say one with additional columns not strictly required to ensure uniqueness of the row. A Primary Key is a minimal Candidate Key, which is to say all constituent columns are strictly required in order to ensure uniqueness.

64.What is mean by structural constraint? Given an example.

Cardinality ratio and participation constraints taken together is referred to as the structural constraint of a relationship type. It specifies the maximum and minimum participation of an entity type in a relationship.

For example, the structural constraint on department entity type in works-for relationship can be represented by (1, n) indicating the fact that every department should have at least 1 employee and at most n employees working for it

65.Write the syntax of the REVOKE IN SQL.

REVOKE <privilege> ON <database table> FROM <user>;

For example, REVOKE SELECT ON EMPLOYEE FROM A3;

66.What is a composite attribute?

**Composite attributes** can be divided into smaller subparts, which represent more basic attributes with independent meanings. For example, the Address attribute of the EMPLOYEE entity can be subdivided into Street, address, City, State, and Zip

3. Differentiate between where clauses and having clause.

Where clause specifies condition on individual rows while having clause specifies condition on group of rows.

67.List the aggregate functions.

* count()
* sum()
* max()
* min()
* Avg()

68.What is join?

The JOIN operation, is used to combine *related tuples* from two relations into single “longer” tuples. This operation is very important for any relational database with more than a single relation because it allows us to process relationships among relations.