① What is Join? Discuss different types of joins.

A Join clause is used to combine rows from two or more tables, based on a related column between them.

Types:
* Inner Join
* Left outer Join
* Right outer Join
* Full outer Join
* Self Join

③ Give the syntax to create stored procedure with example

Syntax:

```
CREATE PROCEDURE [schema_name].procedure_name
       @parameter_name data_type,
       parameter_name data_type
AS
BEGIN
   -- SQL statements

   -SELECT, INSERT, UPDATE or DELETE statement
END.
```

EX:
```
CREATE PROCEDURE studentList
AS
BEGIN
   SELECT name, age salary FROM STUDENT ORDER BY salary
END;
```

2 marks:

② ⑭

Define Trigger. Mention the need for trigger in DBMs.

A Trigger is a set of procedural statements which are executed automatically when there is any response to certain events on the particular table in the database. Triggers are used to protect the data integrity in the database.

Need : It lets you avoid redundant code when multiple programs need to perform the same database operations.

④ ⑯

Functional dependency

Let P and Q be sets of columns, then : P functionally determines Q, written P→Q if and only if any two rows that are equal on P must be equal on Q.

Ex : T1. P = T2. P , then T1. Q = T2. Q.

Where , T1.P ⟹ Projects the tuple T1 onto the attribute in P

⑤ ⑰.

What is the need for normalization?

Database normalization is a very important process as it makes the database free from storage of irrelevant data and removes the duplicate data items from the database. As a result, normalization ensures more free space available in the database.

⑥ State the conditions to be satisfied for a relation to be in 3NF

(i) A relation must be in 2NF (No partial dependency)

(ii) No transitive dependency.

$\Downarrow$

If $x \rightarrow y$ is in 3NF then x is, either a key or y is prime attribute.

⑧ Differentiate Cascadeless schedules and Recoverable schedules.

Cascadeless Schedules	Recoverable Schedules
* A schedule were a transaction is allowed to commit even if another transaction overwrites its written data and is later rolled back.	A schedule where a transaction can only read data from transactions that have already committed, ensuring that the efforts of Commited transactions are presevered in case of failure or abort.
* If a schedule is not cascadeless, then it is a cascade rollback schedule	If a schedule is not recoverable then it is irrecoverable.

⑪ How the time stamps are implemented?

Each transaction is assigned a unique timestamp when it starts, and the database system ensures that the transaction are executed in the order of their timestamps.

⑦ ⑲

What do you mean by "Query Optimization"?

Query Optimization is the process of selecting the most efficient query-evaluation plan from among the many strategies usually possible for processing a given query, especially if the query is complex.

⑨ ㉑

Enumerate the properties of a transaction.
* Atomicity : No transaction in the database is left half completed.

* Consistency : The database must remain in consistent state after performing any transaction.

* Isolation : No transaction will affect the existence of any other transaction.

* Durability: The database should be strong enough to handle any system failure.

⑩ ㉒

Give the reasons for allowing concurrency

The reasons for allowing concurrency is if the transactions run serially, a short transaction may have to wait for a preceding long transaction to complete, which can lead to unpredictable delays in running a transaction. So concurrent execution reduces the unpredictable delays in running transactions.

13. Updates through view are not possible. Why?

The SQL update view command can be used to modify the data of a view. All views are not updatable. So, UPDATE command is not applicable to all views. An updatable view is one which allows performing a UPDATE command on itself without affecting any other table.

15. List two reasons why null values might be introduced into the database.

i) When a particular attribute does not apply to an entity.

ii) Values of an attribute is unknown, although it exists.

iii) When the value is unknown because it does not exist.

18. State the conditions to be satisfied for a relation to be in BCNF.

i) A relation must be in 3NF.

ii) For every functional dependency, LHS must be a super key.

20.

Strict two phase locking	Rigorous Two phase locking
* Strict 2PL is most restrictive form of 2PL.	* Rigorous 2PL is stricter than strict 2PL.
* All the exclusive mode locks be held until the transaction commits.	* All locks are to be held until the transaction commit.
* It is guarantee serializability.	* It does not guarantee serializability.
* It may lead to decreased concurrency.	* It allows for increased concurrency.

23. If deadlock is avoided by deadlock avoidance schemes, is starvation still possible? Justify your answer.

Ans: A transaction may become the victim of deadlock-prevention roll-back arbitrarily many times, thus creating a potential starvation situation.

24. When is a transaction rolled back?

A transaction cannot be rolled back after a COMMIT TRANSACTION statement is executed, except when the COMMIT TRANSACTION is associated with a nested transaction that is contained within the transaction being rolled back.