Q-1 (i)

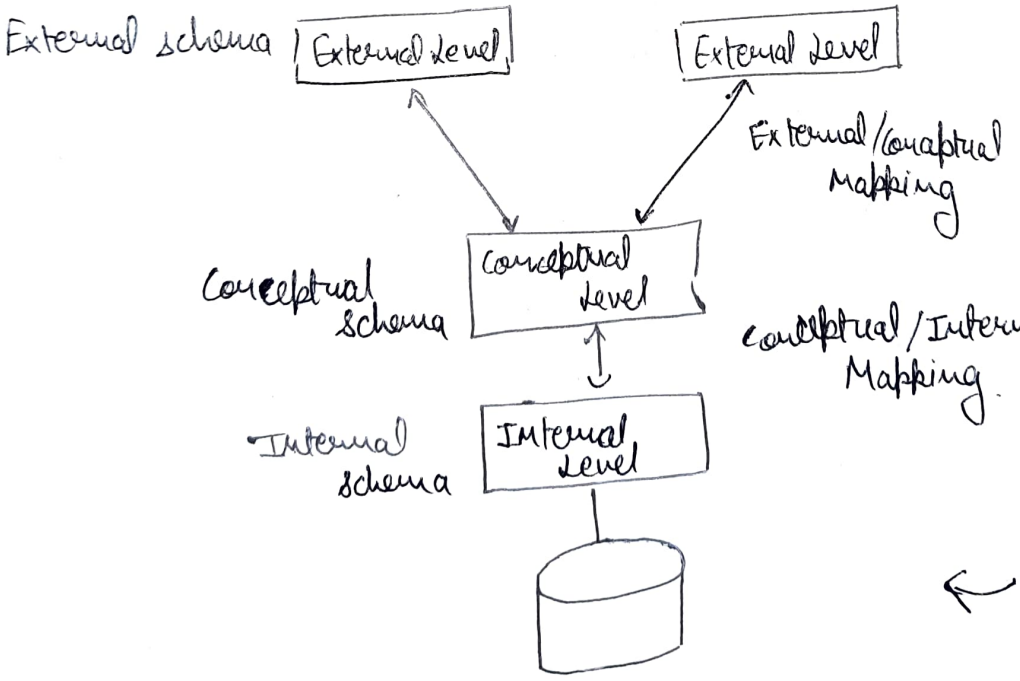
Ans 1(i) → Three schema architecture contains internal level, conceptual level, and external level.

In the internal level physical structure of the database described. The internal schema is also known as physical schema, as it is used to define as data that stored in block. Internal schema describes a sophisticated level of data structure in detail.

The conceptual level of the database has described, and it is known as a logical level. The conceptual level describes the whole structure of database. It describes relationship among data. Implementation of data are hidden on a theoritical level.

On the external level, databases contains schemes that represent a different view of the database. Each describes the database that the user interested in and hides the remaining database. The external database is also known as view schema.

The mapping between schema level happens due to visualisation and schema matching. DBMS has 3 schema level.



← It shows the DBMS architecture.

- Mapping is a way to transfer and respond to the request between the various database architecture.

- Mapping takes more time to transfer data in small DBMS
- External/Conceptual mapping transforms the data from the outer level to conceptual schema.
- In conceptual/Internal mapping response transforms from conceptual to Internal level.

~~[redacted]~~

Q1 (ii)

Ans 1(ii) * Entity Type : It is a collection of the entity having similar attributes. In the above student table example, we have each row as an entity and they are having common attribute i.e each row has its own value for attributes Roll_No, Age Student_name and Mobile_No.

* Entity Set : Entity set is a collection of entities of the same entity type. In the above example as STUDENT entity type, a collection of entities from the student entity type would form an entity set.

ENTITY	ENTITY TYPE	ENTITY SET
A thing in the real world with independent existence	A category of a particular entity	Set of all ~~entities~~ attributes of a particular entity
Any particular row (a record) in a relation (table) is known as entity	The name of a relation (table) in RDBMS is a entity type	All rows of a relation (table) in RDBMS is entity set.

Q-2(i)

Ans ⇒ Inner join operation divided into three subtypes.

a) Theta join: Theta join allows you to merge two tables based on the condition represented by theta. Theta joins work for all comparison operators.

b) EQUI Join: EQUI join is done when a theta join uses only the equivalence condition. EQUI join is the most difficult operation to implement efficiently in an RDBMS, and one reason why RDBMS has essential performance problems.

c) Natural Join: Natural join does not utilize any of comparis-ion operators. In this type of join, the attributes should have the same name and domain. In natural join, there should be atleast one common attribute between two relations.

⇒ A theta join allows for arbitrary comparision relationship (such as ≥). In a relational database, a join is just an expression involving more than one table and formulas between the column of those table that restrict the result set.

Q-2(i?)

Ans 2(ii) # The GROUP BY statement in SQL is used to arrange identical data into groups with the help of some function. i.e. If a particular column has same value in different rows then it will arrange these rows in a group.

- GROUP BY clause is used with the SELECT statement
- In the query, GROUP BY clause is placed after where clause.
- In the QUERY, GROUP BY clause is placed before ORDER BY clause if used any.

	Where Clause	Having Clause
1	→ WHERE clause is used to filter the records from the table based on the specified condition	→ HAVING clause is used to filter record from the groups based on the specified condition.
2	→ Where clause can be used without GROUP BY clause	→ HAVING clause cannot be used without GROUP BY clause.
3	→ WHERE clause implements in row operations	→ Having clause implements in column operations.
4	→ WHERE clause cannot contain aggregate functions	→ HAVING clause can contain aggregate function.
5	→ WHERE clause can be used with SELECT, UPDATE, SELECT statement	→ HAVING clause can only be used with SELECT statement.

Q-3(i)

Ans 3(i) Normalisation is the process of organizing the data in database

→ It is used to minimize the redundance from a relation or set of relations. It is also used to eliminate, update & deletion ~~abnormalities~~ anomalies

→ Normalisation divides the larger table into the smaller table and links them using relationships.

→ The normal form is used to reduadancy from database table.

* Types of Normal Form ① (1NF)

→ A relational will be 1NF of its contains an atomic value

→ It states that an attribute of a table cannot hold multiple values. It must hold only single - valued attributes.

(ii) (2NF):

→ In 2NF, relational must be in 1NF
→ In 2NF, all non-key attributes are fully functional dependent on the primary key.

(iii) (3NF)

→ A relational will be in 3NF if it is in 2NF and no transition dependency exist.

(iv) (4NF)

→ A relation will be in 4NF if its in Boyle codd normal form and has no-multi-valued dependency.

(v) (5NF)

→ A relation is in 5NF if it is in 4NF and not contains any join dependency and joining should be lossless.

Q-3(ii)

Ans 3(ii) Transaction → It is a set of logically related operation. It contains a group of tasks. A transaction is an action or series of actions. It is performed by a single user to perform operations for accessing the contents of the database.

Granularity → It is size of the data item allowed to lock. Now multiple Granularity means hierarchy breaking up the database into blocks that can be locked and can be tracked needs what needs to lock and in what fashion.

Concurrency → This comes from under the transaction in DBMS. It is a procedure in DBMS, Helping in management of 2 process, without conflicts.

Dirty Read → It occurs when one transaction is permitted to read data that is modified by another concurrently.

Serializability → Strictest SQL transaction isolation, permitting concurrent transactions. Prevents modifying rows while being read.

Acid Properties: The acid properties are meant for the B transaction that goes through a different group of tasks, and there became to see the role of the ACID - properties.

Q-4(i),

Ans 4(i) Different Dead lock prevention techniques.

* → Wait - die scheme
* → Wound - Wait scheme
→ No waiting Algorithm
→ Cautious waiting
→ Wait - for - Graph.

⇒ The younger transaction in wait-die: When an older transaction tries to lock a DB element that has been locked by a younger transaction, it waits. When younger transaction tries to lock a DB element that has been locked by an older transaction, it dies.

⇒ younger transaction in Wound Wait: Older traction ~~lock~~ lock a DB element that has been locked by a younger transaction, it wounds the younger transaction. When a younger transaction tries to lock a DB element that has been locked by an older transaction, it waits.

Q-4(ii)

Ans 4(ii) Wait - Die Scheme.

In this, If a transaction requests a resource that is locked by another transactions, then the DBMS simply checks the time stamp of both transactions and allows the older transactions to wait until the resource is available for execution. Suppose, there are two transactions.

* Wound Die Scheme

Here, If older blocks resource, It forces younger to to kill the transaction and release resource. The younger transaction is restated with a minute delay but with the same time stamp. If the younger transaction is requesting a resources that is held by an older one, then the younger transaction is asked to wait till the older one release it.

Q-5)

Ans 5) (1) Database recovery :- Database prone to, network failures errors etc., So recovery techniques are highly important, 4 techniques available are.

1) Mirroring
2) Recover using backups
3) Recover using transition tags
4) Shadow paging.

1) Mirroring :- It uses non-stop, fault tolerant operations, maintains on-line on different stable.

2) Recover using Backups :-

Immediate Backup in floppy or magnetic types, these are handy if technical fault in primary database. Such as crashing, damage etc.

Archive Backup

Kept in mass storage, in CD-Roms internal service etc. It is safe from threats / destructions.

3) Recovery using transition log

Step 1 → Scanning transactions entry, non-recorded. [commit ''] entry.

Step 2 → Transaction Roll back.

Step 3 - Transaction which recorded a [commit "] must have recorded changes.

4) Shadow :- Systems used for recovery instead of transaction logs. In shadow paging a data base divided into several fixed size disk pages.

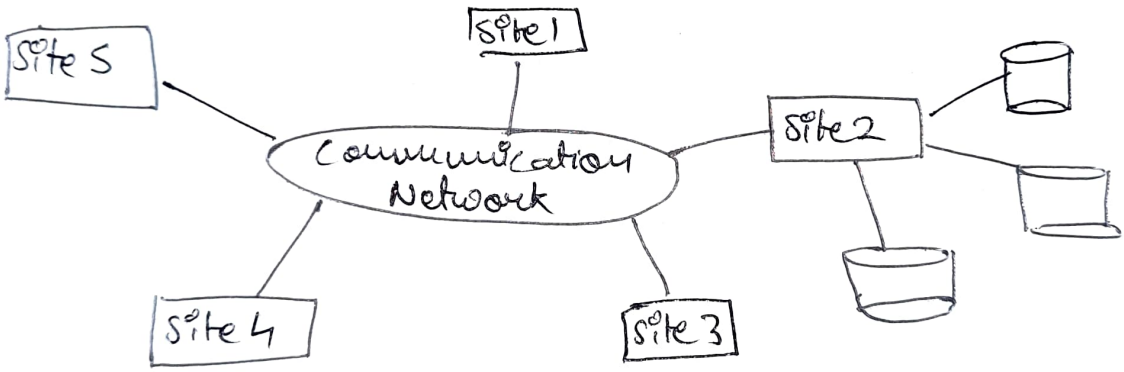
Aries Recovery Algorithm → It is a example of recovery algorithm used in DBMS. Used ~~in~~ many relational Products of IBM. ARIES uses a Steal In B-force approach for reconstruction when state occured.

Q-5 (ii)

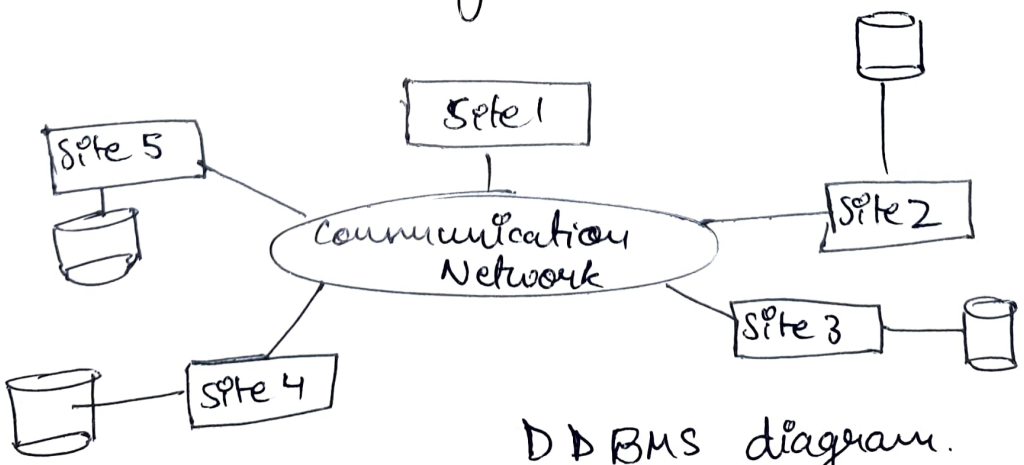
Ans 5 (ii) A distributed database is a database in which portions of the database are stored in multiple physical locations and processing is distributed among multiples database nodes.

→ A DDBMS - Integrates the data logically so it can be managed as if it were all stored in the same location.

DBMS is database management system. A DDBMS is distributed database mangement system, meaning it can spread across multiple servers. DDBMS is proper subset of DBMS.



DBMS diagram.



DDBMS diagram.

Promises

- Transparent management of distributed, fragmented and replicated data.
- Improved reliability / availability through distributed transactions
- Improved performance
- Easier and more economical system expansion.