

Quant 10% Weightage

Q1. A shopkeeper marks his goods 40% above the cost price. He allows a discount of 25% on the marked price. If his sales volume drops by 10% due to the discount, what is his overall percentage change in profit? [Level 1, Capgemini, Percentage]

- A. 2.5% increase
- B. 3.5% decrease
- C. 4.5% increase
- D. 5% decrease

Ans: B

Hint: Assume the cost price (CP) per unit is Rs. 100 and initial sales quantity is 100 units. Calculate initial total profit. Then calculate the selling price (SP) per unit after the discount. Calculate the new total profit based on the reduced sales quantity and find the percentage change.

Q2. In an examination, 30% of the students failed in Mathematics, 20% failed in English, and 10% failed in both. If 400 students passed in both subjects, what is the total number of students who appeared for the exam? (Cognizant)

- A. 600
- B. 750
- C. 800
- D. 1000

Ans: C

Hint: Use the principle of inclusion-exclusion to find the percentage of students who failed in at least one subject: $P(\text{Math or English}) = P(\text{Math}) + P(\text{English}) - P(\text{Math and English})$. The remaining percentage represents those who passed in both.

Q3. A car's value depreciates by 15% in the first year, 10% in the second year, and 5% in the third year. If its value after 3 years is Rs. 1,22,400, what was its original value? [Level 1, Capgemini,

- A. Rs. 1,50,000
- B. Rs. 1,75,000
- C. Rs. 1,90,000
- D. Rs. 2,00,000

Ans: D

Hint: Let the original value be X. The value after depreciation can be calculated as $X \times (1 - 0.15) \times (1 - 0.10) \times (1 - 0.05)$. Set this equal to Rs. 1,22,400 and solve for X.

Q4. A dishonest dealer claims to sell his goods at cost price but uses a weight of 900 grams for 1 kg. Find his profit percentage. (Accenture)

- A. $9 \frac{1}{11} \%$
- B. 10%
- C. $11 \frac{1}{9} \%$
- D. 12.5%

Ans: C

Hint: The dealer sells 900 grams but charges for 1000 grams. His profit is the difference in weight (100 grams) divided by the actual weight sold (900 grams), expressed as a percentage.

Q5. By selling an article for Rs. 480, a person loses 20%. To make a profit of 20%, at what price should he sell it? (Accenture)

- A. Rs. 680
- B. Rs. 720
- C. Rs. 750
- D. Rs. 800

Ans: B

Hint: If Rs. 480 represents 80% of the Cost Price (CP), first calculate the CP. Then, calculate 120% of that CP to find the desired selling price.

Q6. A trader allows a 20% discount on the marked price of an article and still makes a profit of 25%. If he gains Rs. 360 on the sale, what is the marked price of the article? (Cognizant)

- A. Rs. 2000
- B. Rs. 2160
- C. Rs. 2250
- D. Rs. 2500

Ans: C

Hint: Use the profit amount (Rs. 360) and profit percentage (25%) to find the Cost Price (CP). Then calculate the Selling Price (SP). Since SP is the marked price minus a 20% discount, work backward to find the marked price.

Q7. If $a:b=2:3$, $b:c=4:5$, and $c:d=6:7$, then what is $a:d$? (Tech Mahindra)

- A. 16:35
- B. 24:35
- C. 32:45
- D. 48:70

Ans: A

Hint: Scaling method

Q8. Two vessels contain milk and water mixed in the ratio 5:3 and 2:3 respectively. In what ratio must these two mixtures be mixed to obtain a new mixture in which the ratio of milk to water is 1:1? (Infosys)

- A. 2:5
- B. 3:7
- C. 4:9
- D. 5:8

Ans: A

Hint: apply the alligation rule.

Q9. A sum of money is to be distributed among A, B, C, and D in the proportion 5:2:4:3. If C gets Rs. 1000 more than D, what is B's share? (Tech Mahindra)

- A. Rs. 2000
- B. Rs. 2500
- C. Rs. 3000
- D. Rs. 4000

Ans: A

Hint: Let the common factor for the shares be x . The shares are $5x, 2x, 4x, 3x$. The difference between C's and D's share is given as Rs. 1000. Use this to find the value of x .

Q10. A certain sum of money amounts to Rs. 10,080 in 5 years and to Rs. 11,648 in 7 years at simple interest. Find the sum and the rate of interest. (Accenture)

- A. Rs. 6000, 10%
- B. Rs. 6400, 10%
- C. Rs. 6400, 12%
- D. Rs. 7000, 11%

Ans: C

Hint: The difference in the amounts over the difference in years gives the simple interest for one year. Use this annual interest to find the principal (sum) from either of the given amounts and periods. Then calculate the rate of interest.

Reasoning 10 Weightage

Week3_OLT2(LR)_CSE_Immersion_2025

Direction (Q1 to Q2): In each of the questions below are given some statements followed by two conclusions. You have to take the given statements to be true even if they seem to be at variance with commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

Q1. Statements:

Only area is surface.

Some area is perimeter.

No perimeter is New.

Conclusion:

I. Some New is surface.

II. Some perimeter is surface.

A. If only conclusion I follows.

B. If only conclusion II follows.

C. If either conclusion I or II follows.

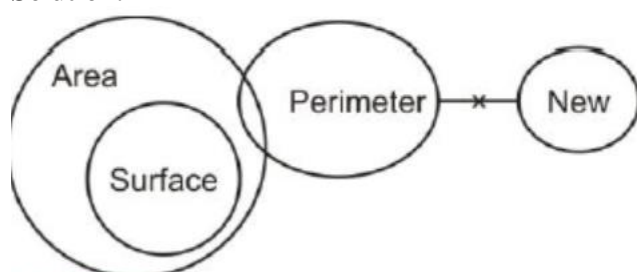
D. If neither conclusion I nor II follows.

E. If both conclusions I and II follow.

[Level-3; Accenture, Wipro, Infosys]

Answer: D

Solution:



If neither conclusion I nor II follows.

Q2. Statements:

Only few Manager is Good.

Only few Good are Appstore.

Some appstore is Like.

Conclusions:

I. All Appstore can be Manager.

II. Some Like is Good.

A. If only conclusion I follows.

B. If only conclusion II follows.

C. If either conclusion I or II follows.

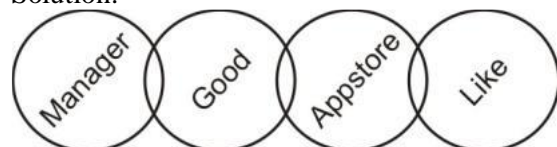
D. If neither conclusion I nor II follows.

E. If both conclusions I and II follow.

[Level-3; Accenture, Wipro, Infosys]

Answer: A

Solution:



If only conclusion I follows.

Directions(Q3 to Q4)

In each question given below are some statements followed by conclusions numbered. You have to take the given statements to be true even if they seem to be at variance with commonly known facts and then decide which of the given conclusion/s logically follows from the given statements.

Q3. STATEMENTS: All books are pens.

Some pens are pencils.

CONCLUSIONS: I) Some pens are books.

II) No pen is book.

III) Some books are pencils.

IV) No books are pencils.

A. I and III follows B. only I follows

C. either I or II follows D. either III or IV and I follows

[Level-3; Topic-Syllogism; Accenture, Wipro, infosys]

Answer: D

Q4. STATEMENTS: No systems are decks.

All decks are books.

CONCLUSIONS: I) Some systems are books.

II) Some systems are not books.

III) Some books are systems.

IV) Some books are not systems.

A. only II follows B. only IV follows

C. II, III and IV follows D. either I or II and IV follows

[Level-3; Topic-Syllogism; Accenture, Wipro, infosys]

Answer: D

Directions (Q5 to Q10): In each question below are given two or three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts. Read all the conclusions and decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Q5. Statements: Squares are circles.

Circles are triangles.

Some triangles are rectangles.

Conclusions: I. Some circles are rectangles.

II. Squares are triangles.

A. if only conclusion I follows.

B. if only conclusion II follows.

C. if either conclusion I or conclusion II follows.

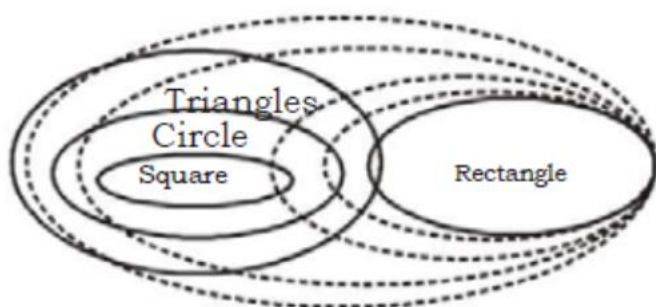
D. if neither conclusion I nor conclusion II follows.

E. if both conclusion I and conclusion II follow.

[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

Answers: B

Solution:



Q6. Statements: Some tigers are panthers.

No lion is a tiger.

Conclusions I. Some panthers being lions is a possibility.

II. Panthers, which are not tigers, being lions is a possibility.

A. if only conclusion I follows.

B. if only conclusion II follows.

C. if either conclusion I or conclusion II follows.

D. if neither conclusion I nor conclusion II follows.

E. if both conclusion I and conclusion II follow.

[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

Answer: E

Solution:



Q7. Statements: All doctors are perfect.

All engineers are perfect.

Conclusions I. There is a possibility that some doctors are engineers.

II. All perfects are either doctors or engineers.

A. if only conclusion I follows.

B. if only conclusion II follows.

C. if either conclusion I or conclusion II follows.

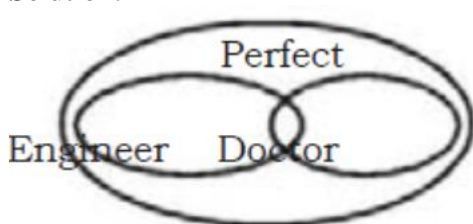
D. if neither conclusion I nor conclusion II follows.

E. if both conclusion I and conclusion II follow.

[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

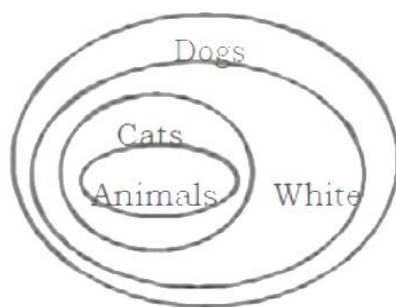
Answer: A

Solution:

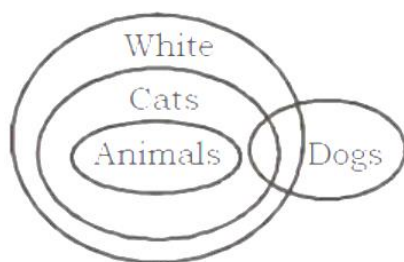


Q8. Statements: All eggs are tomatoes.

No tomato is a potato.



OR



All potatoes are goods.

Conclusions I. Some tomatoes may be goods.

II. All eggs being goods is a possibility.

A. if only conclusion I follows.

B. if only conclusion II follows.

C. if either conclusion I or conclusion II follows.

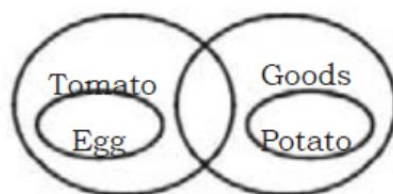
D. if neither conclusion I nor conclusion II follows.

E. if both conclusion I and conclusion II follow.

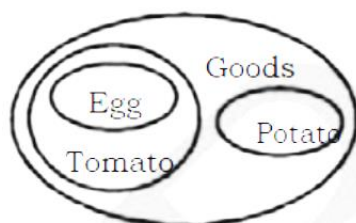
[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

Answer: E

Solution:



OR



Hence, both conclusions I and II follow.

Q9. Statements: Some dogs are cats.

All animals are cats.

All cats are whites.

Conclusions I. All those dogs which are cats are also whites.

II. All the animals may or may not be dogs.

A. if only conclusion I follows.

B. if only conclusion II follows.

C. if either conclusion I or conclusion II follows.

D. if neither conclusion I nor conclusion II follows.

E. if both conclusion I and conclusion II follow.

[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

Answer: E

Solution:

Hence, both conclusions I and II follow.

Q10. Statements: Some golds are silver.

All silvers are white.

No white is a yellow.

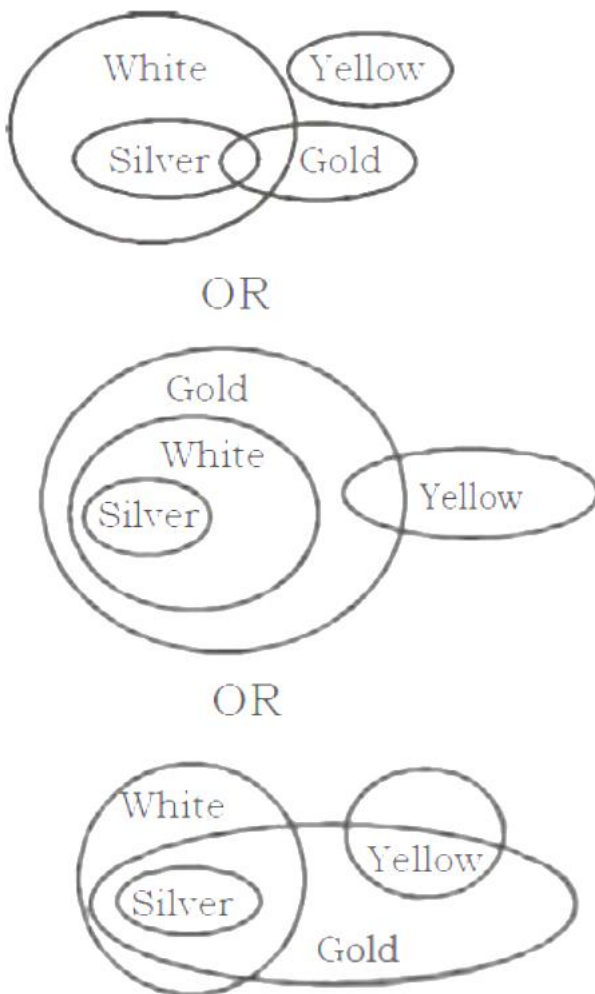
Conclusions I. Some golds which are white are not yellow.

II. Some golds being yellow is a possibility.

- A. if only conclusion I follows.
 B. if only conclusion II follows.
 C. if either conclusion I or conclusion II follows.
 D. if neither conclusion I nor conclusion II follows.
 E. if both conclusion I and conclusion II follow.
[Level-2; Topic-Syllogism; Accenture, TCS, Wipro, Infosys]

Answer: E

Solution:



Hence, both conclusions I and II follow.

Verbal 10 % Weightage

Instructions (Q.1 to Q.7): Choose the option that best improves the underlined part of the sentence.
(Wipro)

1. The data collected from various departments over the last two years reveal serious discrepancies in the financial reporting practices of the organization.
 (a) reveal serious discrepancies in the financial reporting practices
 (b) reveals serious discrepancies in the financial reporting practices
 (c) reveals serious discrepancy in the financial reporting practice

(d) revealed serious discrepancies in the financial reporting practices

Answer: (b)

Hint: "Data" is treated as a singular mass noun in this context → use "reveals."

2. Not only the CEO but also the board members has expressed concerns about the company's declining market share.

- (a) has expressed concerns about the company's declining market share
- (b) have expressed concern about the company's declining market shares
- (c) have expressed concerns about the company's declining market share
- (d) has expressed concern regarding the company's decline in market share

Answer: (c)

Hint: With "Not only...but also," verb agrees with the nearer subject → "board members" (plural) → use "have expressed."

3. The group of scientists, as well as the lead researcher, are advocating for increased funding to support the next phase of experimentation.

- (a) are advocating for increased funding to support the next phase
- (b) is advocating for increased funding to support the next phase
- (c) are advocating to support increased funding for the next phase
- (d) has advocated increased funding supporting the next phase

Answer: (b)

Hint: Subject is "group," a singular collective noun → use "is advocating."

4. Each of the proposed solutions were deemed inadequate in addressing the core challenges faced by the engineering team.

- (a) were deemed inadequate in addressing the core challenges
- (b) has been deemed inadequate for addressing the core challenges
- (c) was deemed inadequate in addressing the core challenges
- (d) was deemed inadequate addressing the core challenge

Answer: (c)

Hint: "Each" is singular → use "was deemed."

5. The policies, while effective on paper, fails to account for the complexities of real-world implementation in diverse regions.

- (a) fails to account for the complexities of real-world implementation
- (b) fail to account for complexities in real-world implementation
- (c) fail to account for the complexities of real-world implementation
- (d) have failed to account the complexities of real-world implementation

Answer: (c)

Hint: "Policies" is plural → use "fail."

6. Neither the prolonged negotiations nor the revised proposal have succeeded in resolving the labor dispute that has paralyzed production.

- (a) have succeeded in resolving the labor dispute
- (b) has succeeded in resolving the labor dispute
- (c) have succeeded at resolving the labor dispute
- (d) have been succeeding in resolving the labor dispute

Answer: (b)

Hint: With "Neither...nor," verb agrees with the nearer subject → "proposal" (singular) → use "has."

7. The legal team argued that the evidence presented were insufficient to support a conviction beyond reasonable doubt.

- (a) were insufficient to support a conviction
- (b) was insufficient to support a conviction
- (c) is insufficient to support the conviction
- (d) are insufficient in supporting conviction

Answer: (b)

Hint: "Evidence" is uncountable → use singular verb "was."

Instructions (Q.8 to Q.10): Find the part of the sentence that contains an error.

(Cognizant)

- 8.** The council (A) / in spite of repeated requests (B) / have not implemented (C) / the new traffic regulations. (D)

Answer: C

Hint: "Council" is singular → use "has not implemented."

- 9.** The committee members (A) / was divided (B) / over how best to proceed (C) / with the funding proposal. (D)

Answer: B

Hint: "Members" is plural → use "were divided."

- 10.** Neither of the solutions (A) / proposed by the engineers (B) / seem practical enough (C) / to be implemented. (D)

Answer: C

Hint: "Neither" is singular → use "seems."

Operating System Threads- Advantage, Thread vs Process:-5% Weightage

Read:-IPC allows processes to communicate and synchronize their actions. Two primary methods are: Method Description Shared Memory Processes share a common memory space. Requires synchronization mechanisms. Message Passing Processes communicate via messages (send/receive). Easier but slower due to OS overhead.

Critical Section: When more than one processes access a same code segment that segment is known as critical section. Critical section contains shared variables or resources which are needed to be synchronized to maintain consistency of data variable.

Critical Section Problem & Race Conditions A critical section is a segment of code where shared resources are accessed. Race conditions occur when the outcome depends on the sequence of process execution.

- ☐ To avoid race conditions, we need mutual exclusion in critical sections.
- ☐ Solutions require three conditions: Mutual Exclusion, Progress, and Bounded Waiting.

Synchronization tools

Semaphores Integer variable used for signalling. Can be binary or counting.

Mutex Mutual Exclusion lock used to prevent race conditions.

Classical Synchronization Problems

- ☐ Producer-Consumer Problem – Synchronizing producer/consumer using buffer.
- ☐ Readers-Writers Problem – Ensuring multiple readers but only one writer.
- ☐ Dining Philosophers – Managing access to shared forks among philosophers.

Computer Networks: Classful IP addresses, Limitations, and problems with classful:-5% Weightage

Classful IP Addressing

In the early days of the Internet, **classful addressing** was used to divide the IP address space into fixed-size blocks called **classes**.

Each IP address is **32 bits** and is written in dotted decimal format (e.g., 192.168.1.1).

→ **IP address = Network part + Host part**

The **class** determines how many bits are for network and how many for hosts.

Classes in Classful IP

Class	Leading bits	Octet Range	Network Bits	Host Bits	Number of Networks	Hosts per Network
A	0	1-255	8	24	16,777,214 (minus reserved)	16,777,214
B	10	128-191	16	16	16,382	65,534
C	110	192-223	24	8	1,048,576	254
D	1110	224-239	28	4	16,382	16
E	1111	240-255	32	0	16	0

Note:

- Class A: Large networks
- Class B: Medium networks
- Class C: Small networks
- Class D: Multicast
- Class E: Reserved for research/experimental
- **Limitations and Problems with Classful Addressing**

Classful addressing was **simple** and easy to implement.

✗ But it led to **inefficient use** of IP addresses.

Key problems:

Wastage of IP addresses

- Organizations often received far more IPs than needed (e.g., Class A = 16 million hosts).
- Many IPs remained unused but still reserved.

No flexibility in allocation

- Fixed sizes (A, B, C) couldn't match actual network requirements.

Fast depletion of IPv4 address space

- Large allocations consumed address space quickly.

Routing table explosion

- More networks (esp. with Class C) meant larger routing tables → more memory and processing in routers.

Subnetting needed to overcome rigid classes

- Classful addressing lacked built-in support for variable-length subnetting.

What replaced Classful?

Classless addressing (CIDR - Classless Inter-Domain Routing)

Allows variable-length network prefixes (e.g., /12, /19).

Tips for MCQs

- Know starting bits & ranges for A, B, C, D, E.
- Understand the number of hosts/networks per class.
- Remember why classful addressing was wasteful.
- Class D = multicast, Class E = reserved.

Database Management System Joins: Inner, Left, Right, Full:-5% Weightage

SQL Joins Overview

Joins are used in SQL to **combine rows** from two or more tables, based on related columns (usually using a common key). Joins are part of the FROM or WHERE clause and determine **which rows appear** in the result.

INNER JOIN

- Returns **only matching rows** from both tables.
- If there is no match between rows, those rows are **excluded** from the result.
- **Example:**

sql

CopyEdit

```
SELECT * FROM A INNER JOIN B ON A.id = B.id;
```

Result: Rows where A.id = B.id.

LEFT JOIN (LEFT OUTER JOIN)

- Returns **all rows from the left table**, plus matched rows from the right table.
- If no match → right table columns show **NULL**.

Example:

sql

CopyEdit

```
SELECT * FROM A LEFT JOIN B ON A.id = B.id;
```

Result: All A rows, and B values where match exists; NULL if no match in B.

RIGHT JOIN (RIGHT OUTER JOIN)

- Opposite of LEFT JOIN.
- Returns **all rows from the right table**, plus matched rows from the left table.
- If no match → left table columns show **NULL**.

Example:

sql

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```
SELECT * FROM A RIGHT JOIN B ON A.id = B.id;
```

Result: All B rows, and A values where match exists; NULL if no match in A.

FULL JOIN (FULL OUTER JOIN)

- Returns **all rows from both tables**.
- If no match in one table → that table's columns will show **NULL**.

Example:

sql

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SELECT * FROM A FULL JOIN B ON A.id = B.id;

Result:

- Matching rows
- Rows from A without a match → B columns NULL
- Rows from B without a match → A columns NULL
- **Summary Table**

Type	What is returned?
R JOIN	with matching values in both tables
JOIN	ws from left table + matched from right (NULL if no match)
T JOIN	ws from right table + matched from left (NULL if no match)
JOIN	ws from both tables (NULL where no match)

Data Structures & Algorithms: Singly/Doubly Linked List – basic operations:- 5% Weightage

SQL Joins Overview

Joins are used in SQL to **combine rows** from two or more tables, based on related columns (usually using a common key).

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LEFT JOIN (LEFT OUTER JOIN)

- Returns **all rows from the left table**, plus matched rows from the right table.
- If no match → right table columns show **NULL**.

Example:

SELECT * FROM A LEFT JOIN B ON A.id = B.id;

Result: All A rows, and B values where match exists; NULL if no match in B.

RIGHT JOIN (RIGHT OUTER JOIN)

- Opposite of LEFT JOIN.
- Returns **all rows from the right table**, plus matched rows from the left table.
- If no match → left table columns show **NULL**.

Example:

SELECT * FROM A RIGHT JOIN B ON A.id = B.id;

Result: All B rows, and A values where match exists; NULL if no match in A.

FULL JOIN (FULL OUTER JOIN)

- Returns **all rows from both tables**.
- If no match in one table → that table's columns will show **NULL**.

Example:

SELECT * FROM A FULL JOIN B ON A.id = B.id; **Result:**

- Matching rows
- Rows from A without a match → B columns NULL
- Rows from B without a match → A columns NULL

Summary Table

Type	What is returned?
R JOIN	with matching values in both tables
JOIN	ws from left table + matched from right (NULL if no match)
T JOIN	ws from right table + matched from left (NULL if no match)
JOIN	ws from both tables (NULL where no match)

Common MCQ traps

- INNER JOIN never returns unmatched rows.
- LEFT JOIN keeps all left table rows, even if unmatched.
- RIGHT JOIN keeps all right table rows, even if unmatched.
- FULL JOIN = LEFT + RIGHT combined.
- FULL JOIN ≠ CROSS JOIN.

Singly Linked List (SLL)

A linear data structure where **each node points to the next node**. Each node contains:

[data | next]

- data: stores the value.
- next: pointer to the next node.

The last node's next is NULL.

Basic operations on SLL

Insertion

- At beginning: new node's next → current head.
- At end: new node added, last node's next → new node.
- At position: traverse, adjust pointers.

Deletion

- Remove node by adjusting the previous node's next pointer to skip the deleted node.

Traversal

- Start at head, follow next until NULL.

SLL can be traversed only in one direction (head → end).

Doubly Linked List (DLL)

A linear data structure where **each node points both to the next and previous node**. Each node contains:

[prev | data | next]

- prev: pointer to the previous node.
- data: value.
- next: pointer to the next node.

The first node's prev is NULL, last node's next is NULL.

Basic operations on DLL

Insertion

- At beginning: new node's next → head, head's prev → new node.
- At end: last node's next → new node, new node's prev → last node.
- At position: adjust both next and prev pointers.

Deletion

- Adjust prev and next pointers of neighboring nodes to skip the deleted node.

Traversal

- Can move **forward (head → end)** or **backward (end → head)**.

DLL requires **more memory per node** (because of prev).

DLL is **easier to insert/delete at both ends** or from middle without needing to traverse from head.

Comparison Table

Feature	Singly Linked List	Doubly Linked List
Traversal	One direction (head → end)	Both directions (head → end and end → head)
Memory	Less (only next pointer)	More (extra pointer for prev)
Insertion	Requires traversal to find position	Can insert at both ends easily
Deletion	Requires traversal to find node	Can delete given node directly (if pointer to node)
Complexity of insertion/deletion	O(n) from head	O(1) from head or tail

Feature	Singly Linked List	Doubly Linked List
Reverse traversal	Not possible	Possible

SQL Basic SQL Query with Functions, Joins and Subquery:-15% Weightage

Basic SQL Query Structure

A **SQL query** retrieves data from a database table.

Basic syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition
GROUP BY column
HAVING condition
ORDER BY column [ASC | DESC];
```

SQL Functions

SQL functions help **process data** in queries.

Aggregate Functions (work on groups of rows)

Function	Description
COUNT()	Number of rows
SUM()	Sum of numeric column
AVG()	Average value
MAX()	Maximum value
MIN()	Minimum value

SQL Joins

Used to combine rows from two or more tables based on related columns.

Join Type	Returns
INNER JOIN	Matching rows
LEFT JOIN	All rows from left table + matched right rows (NULL if no match)

Type	Returns
LEFT JOIN	Left + matched left rows (NULL if no match)
INNER JOIN	Rows from both (NULLs for missing matches)

```
SELECT A.id, B.name
FROM A
INNER JOIN B ON A.id = B.id;
```

SQL Subqueries

A **subquery** is a query inside another query.

Types:

- **In WHERE clause**
- `SELECT name FROM emp`
- `WHERE salary > (SELECT AVG(salary) FROM emp);`

In FROM clause

```
SELECT AVG(sub.salary)
```

```
FROM (SELECT salary FROM emp) sub;
```