

FINAL TERM

D.S AND ALGO

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Bs CS 4th

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Q NO 1.

→ FILL THE BLANKS :

- 1 Vertex
- 2 Multiple / parallel edge.
- 3 Adjacent edges.
- 4 Simple path
- 5 Cycle
- 6 Source node
- 7 Sink.
- 8 Isolated or null graph.
- 9 Regular graph.
- 10 Labeled graph.

• Q NO 2 •

→ CONVERT NOTATIONS :

1. $D - Y * (F / G)$

→ PREFIX :

$D - Y * (F / G)$

D - Y * (F / G)

- D Y * (F / G)

- D * Y (F / G)

- D * Y (/ F G)

→ POSTFIX :

D - Y * (F / G)

D Y * (F / G) -

D Y (F / G) * -

D Y (F G /) * -

$$2. \quad T/W^{\wedge}R + S * M - Y^{\wedge}K$$

→ PREFIX :

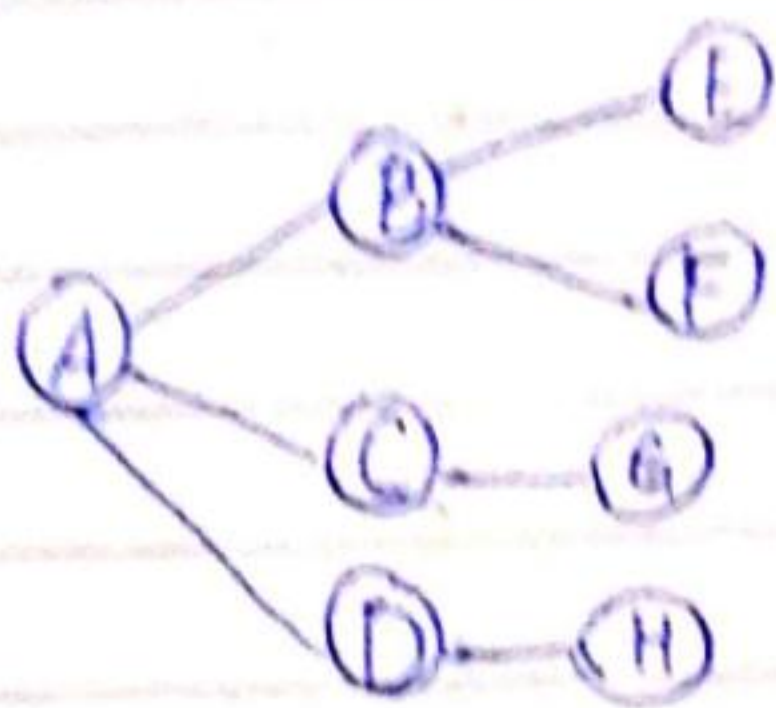
$$\begin{aligned}
 & T/W^{\wedge}R + S * M - Y^{\wedge}K \\
 & \underline{T/W^{\wedge}R} + \underline{S * M - Y^{\wedge}K} \\
 & + \underline{T/W^{\wedge}R} \quad \underline{S * M - Y^{\wedge}K} \\
 & + / \underline{T W^{\wedge} R} - \underline{S * M} \underline{Y^{\wedge} K} \\
 & + / T^{\wedge} W R - * S M^{\wedge} Y K
 \end{aligned}$$

→ POSTFIX :

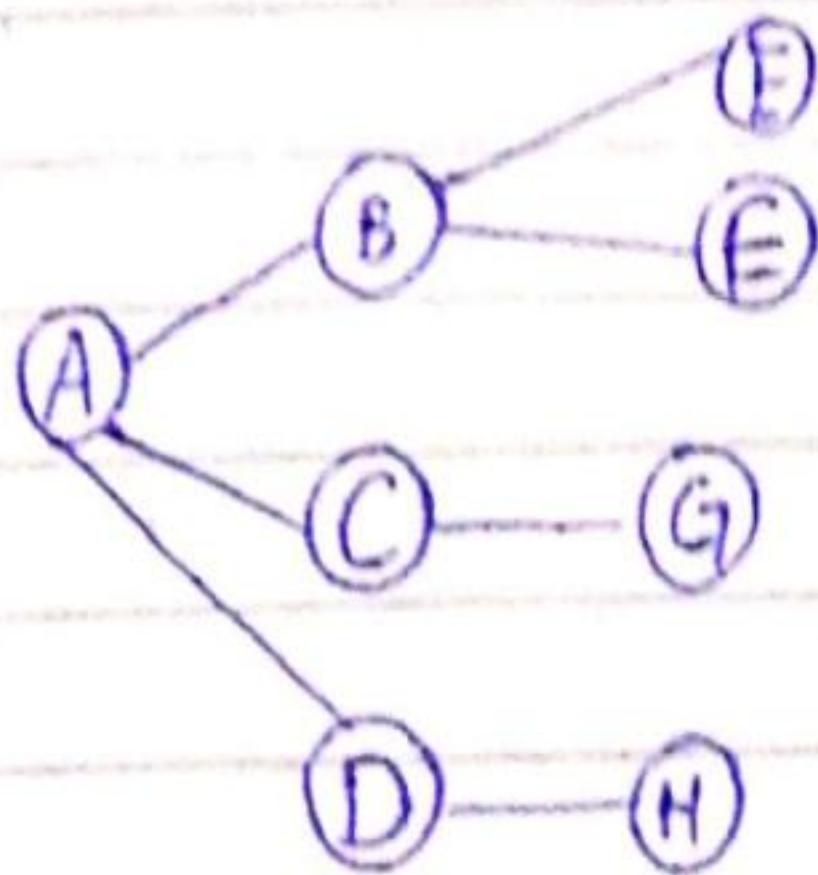
$$\begin{aligned}
 & \underline{T/W^{\wedge}R} + \underline{S * M - Y^{\wedge}K} \\
 & \underline{T/W^{\wedge}R} \quad \underline{S * M - Y^{\wedge}K} + \\
 & T \underline{W^{\wedge}R} / \underline{S * M} \underline{Y^{\wedge}K} - + \\
 & T W^{\wedge} R / S M * Y K^{\wedge} - +
 \end{aligned}$$

Q NO 3.

→ BREADTH-FIRST TECHNIQUE :

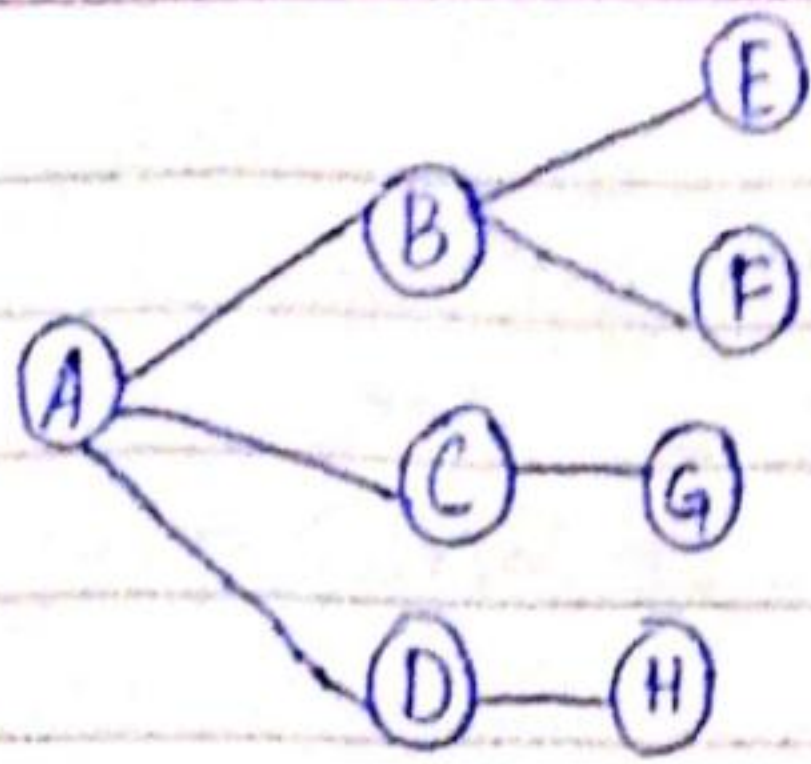


- ① → Add root to the output sequence.
- Mark A as visited.
- A is CWN.

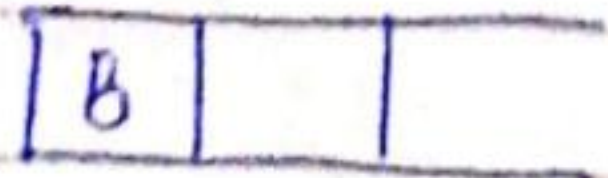


Output seq: A

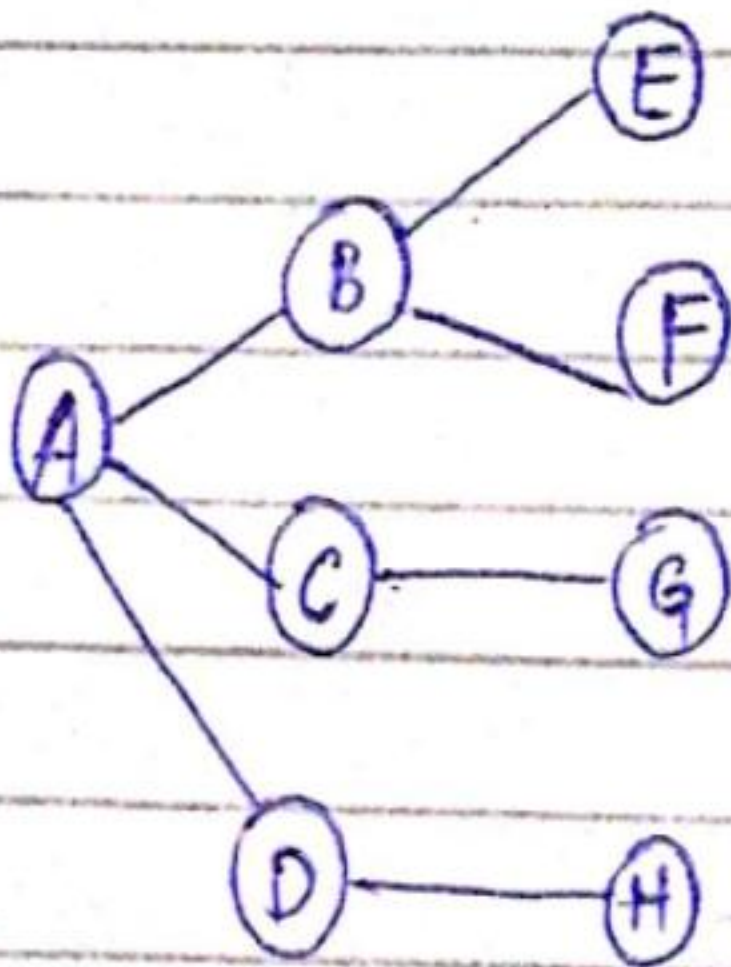
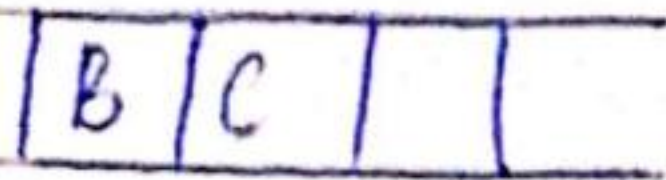
- ② → A is adjacent to B, C and D.
- Now select B and push it into queue
- Add B to the output sequence.
- Mark B as visited



Output seq: A, B



- ③ → From A the adjacent node is C
- Push C into the queue.
- Mark C as visited.
- Add C to output sequence.



Output sequence: A, B, C.

- ④ → D is also adjacent to A
→ D is pushed into queue.

B	C	D
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- Mark D as visited.
→ Add D to the output sequence.

Output Seq = A, B, C, D.

- B is selected as the new COUN.
→ B is popped from queue.

C	D
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- ⑤ → B is adjacent to E and F
→ E is pushed into the queue.

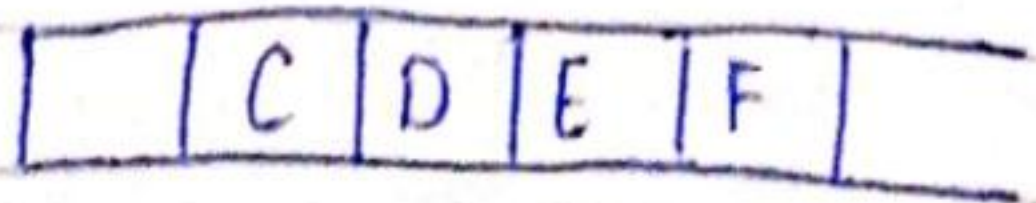
	C	D	E
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- Mark E as visited.
→ Added E to the output sequence.

Output Seq = A, B, C, D, E.

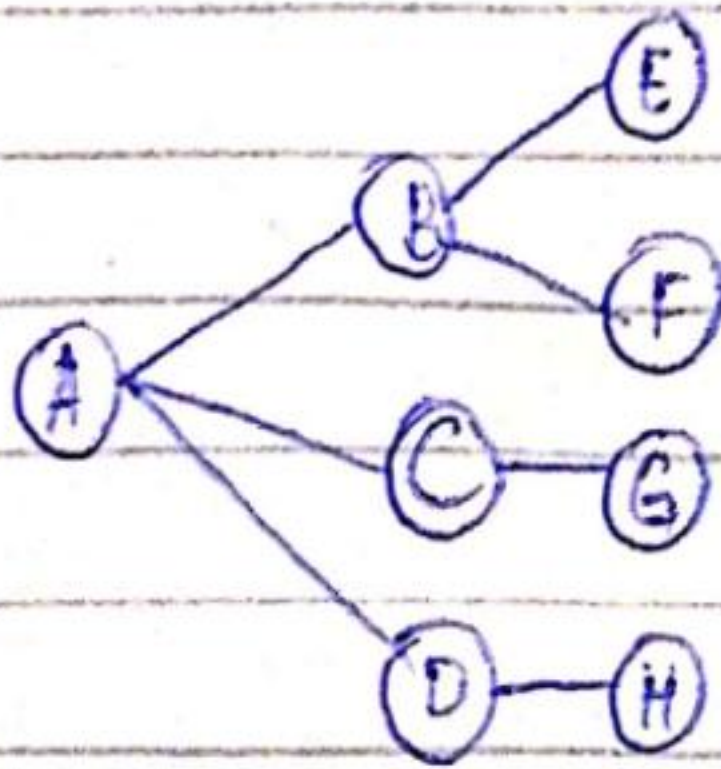
⑥ → As F is adjacent to B i.e. CWN, F is selected.

→ F is pushed into the queue.



→ Marked F as visited

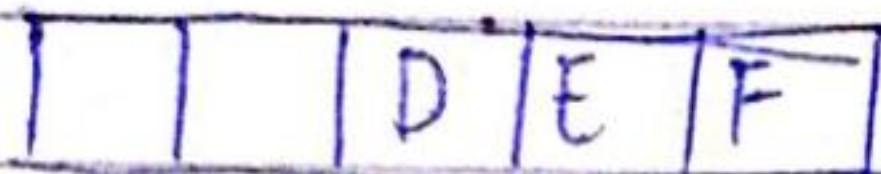
→ F added to the output sequence.



Output seq :- A, B, C, D, E, F

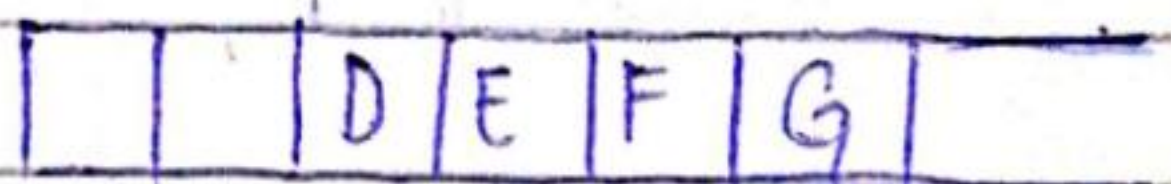
→ Now select C as CWN.

→ Pop out C from the queue.

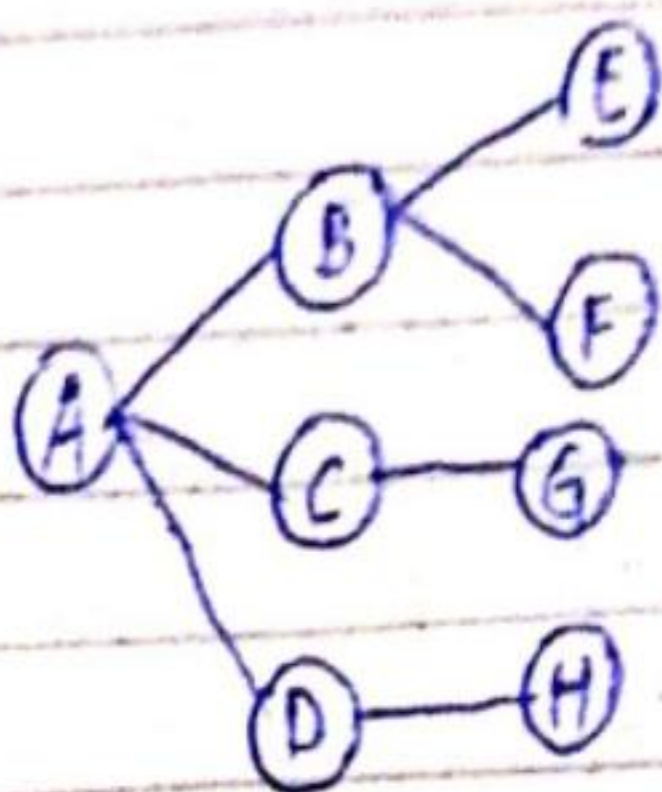


→ From C the adjacent node is G.

→ G is pushed into the queue.

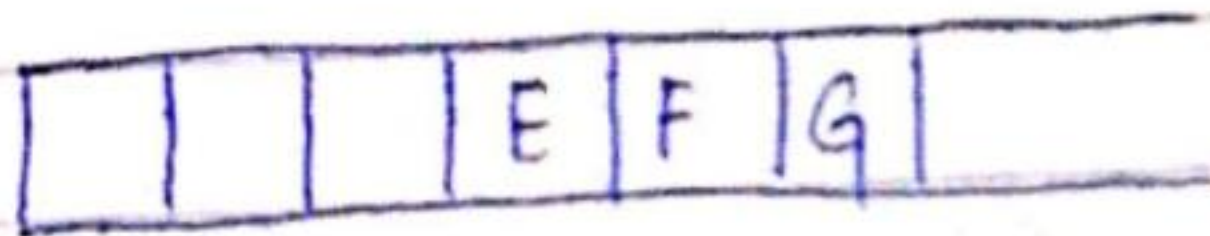


- Mark G visited
- Add G to output sequence.



Output Seq = A, B, C, D, E, F, G

- Now select D as new CWN.
- Pop out D from queue.



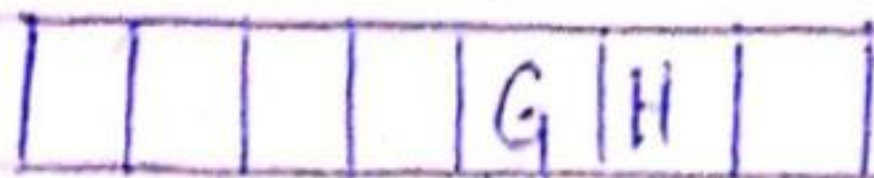
- H is adjacent to D.
- H is pushed to the queue.
- Mark H as visited
- H is added to the output sequence.

Output Seq: A, B, C, D, E, F, G, H.

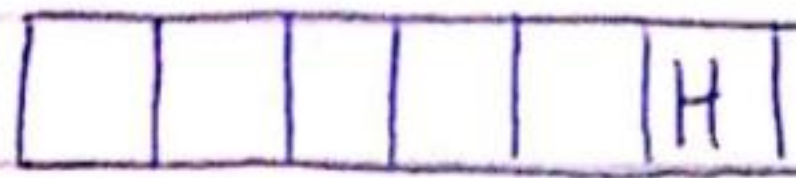
- Now select E as CWN.
- E is popped out of the queue.



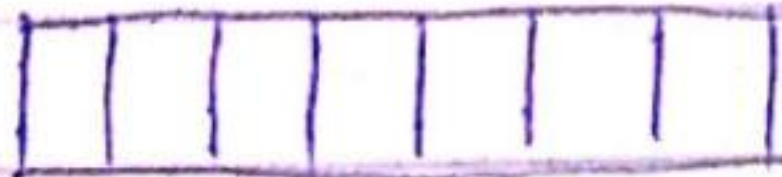
- Now select F as CWN
- F is popped out of the queue.



- No adjacent node to F.
- Now select G as CWN.
- G is popped out of the queue.



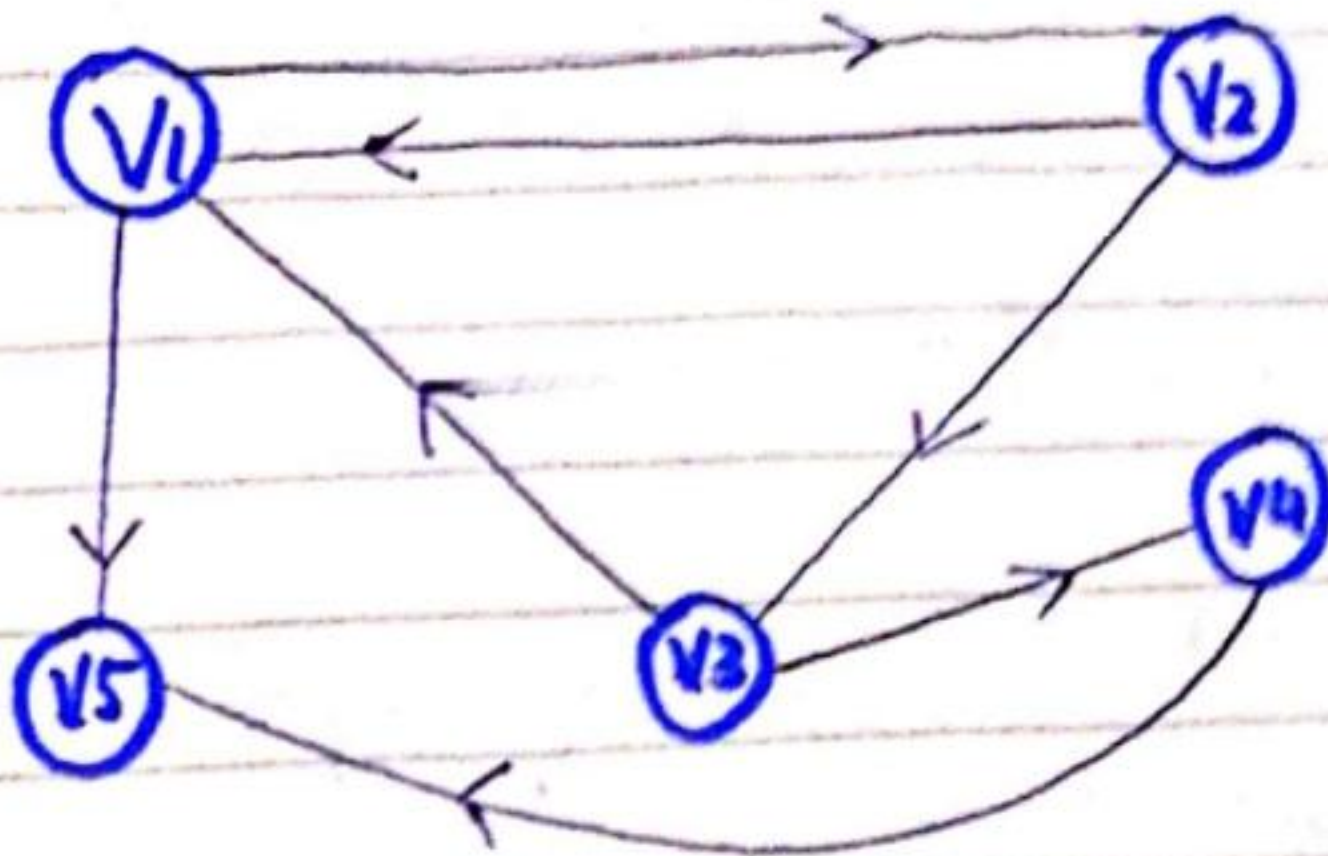
- No adjacent node to G.
- Select H as CWN.
- H is popped from the queue.



- The queue becomes empty, so the breadth first search stops.

• Q NO 4.

→ ADJACENCY MATRIX OF GRAPH :



→ No of nodes = $m = 5$
Ord of $A = m \times m$
 $= 5 \times 5 = 25$

							Out DEGREE
$A =$	V_1	V_2	V_3	V_4	V_5		
	0	1	0	0	1		2
	1	0	1	0	0		2
	1	0	0	1	0		2
	0	0	0	0	1		1
	0	0	0	0	0		0

IN DEGREE 2 1 1 1 2

• Q NO 5.

→ GRAPH FOR ADJECENCY MATRIX:

$$A = [] = \begin{bmatrix} 0 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

Order of $A = m \times m \Rightarrow 5 \times 5 = 25$.

Let nodes be V_1, V_2, V_3, V_4 and V_5 .

