

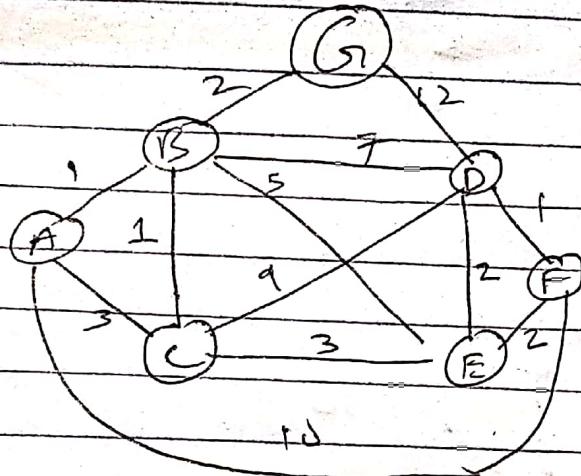
Muhammed Abdullah

BTPIEEE 096

Assignment - 3 & 4

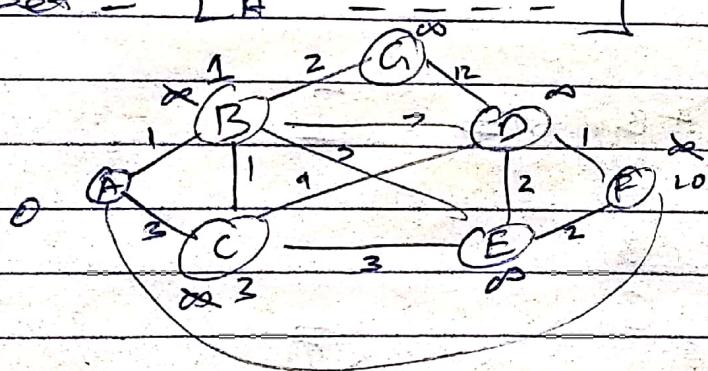
CS1 210

Q3.1)

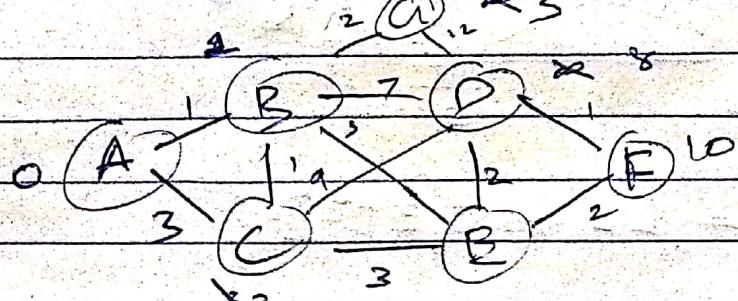


Source node  $\rightarrow$  A

Set = [A — — — ]

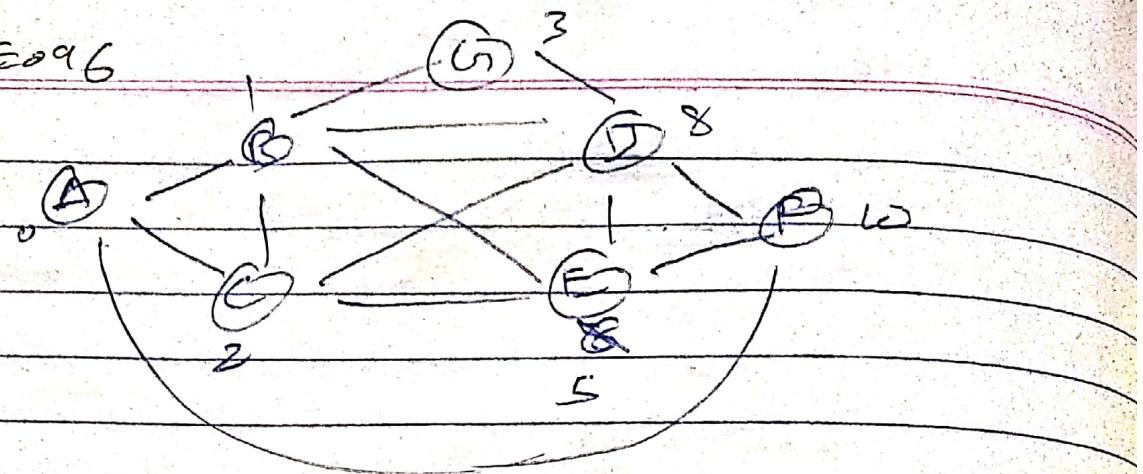


Set = [A B — — — ]

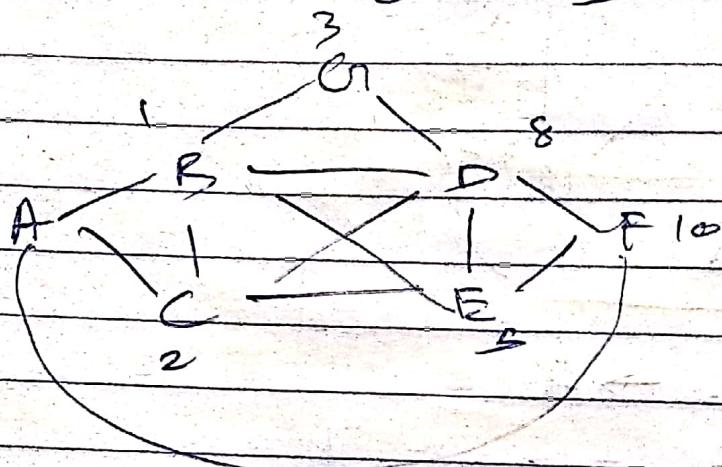


set = [A B C — — — ]

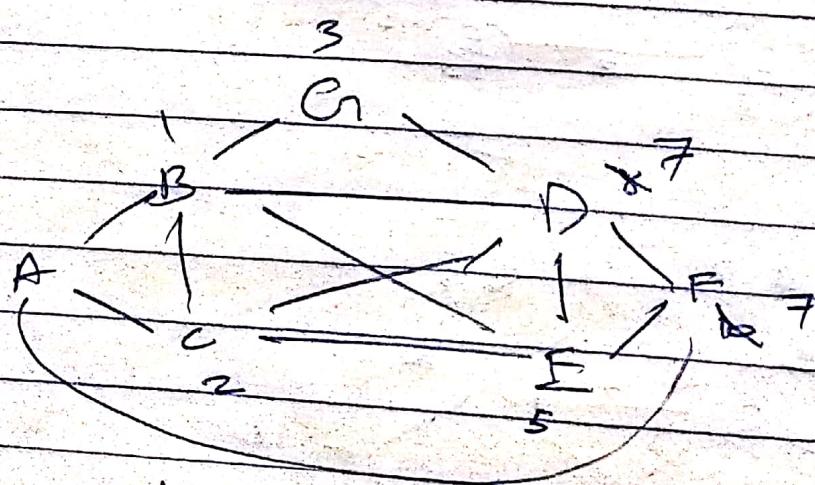
BT19EBE096



set = [ABC(G)]



set = [ABC(GE)]



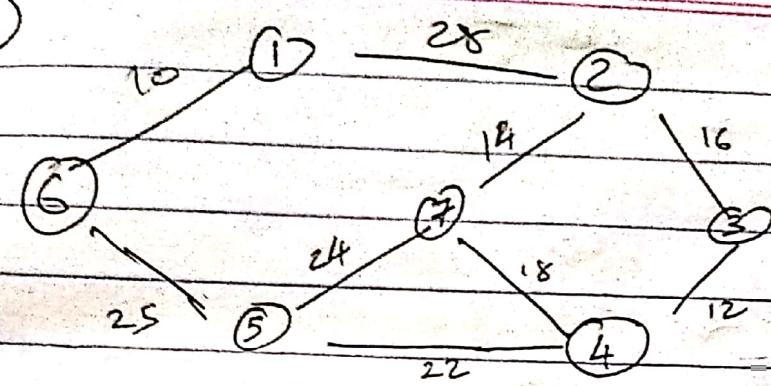
set = [ABC(GE)DF]

Shortest path from A to F

A - B - C - E - F

BT19EEE096

(3)



(1)

Set 1

Set 2

5

4

2) set 1

1

2

set 2

6

7

3

25

4

(3)

set 1

1

2

set 2

6

7

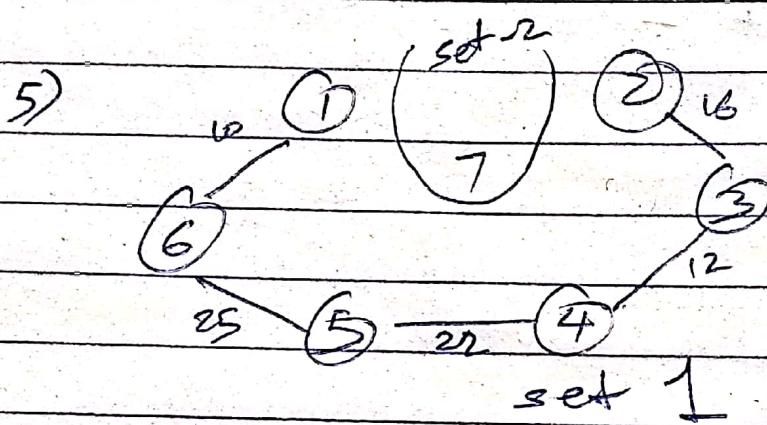
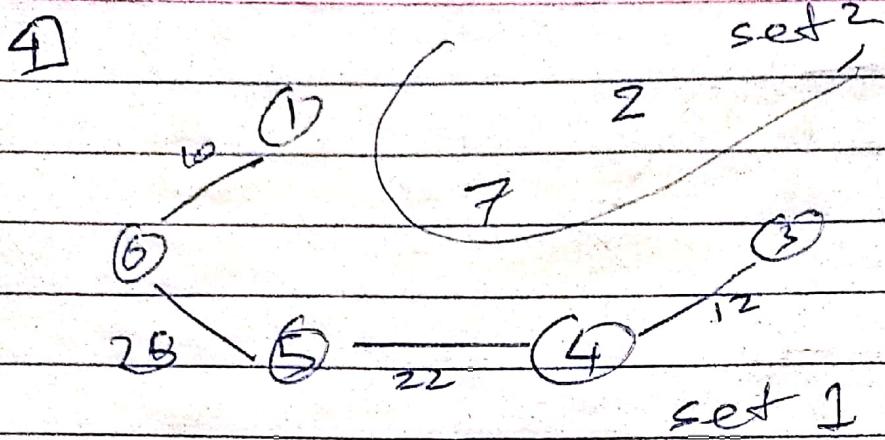
3

5

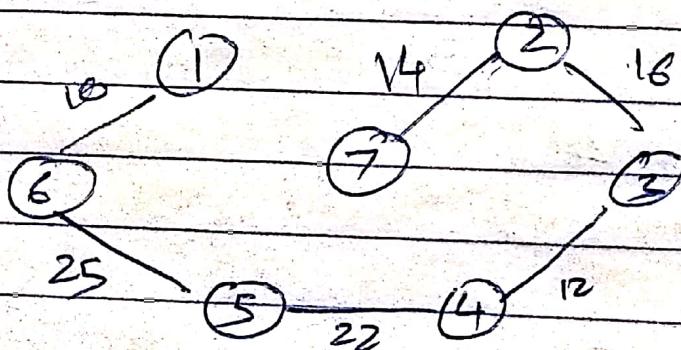
4

1

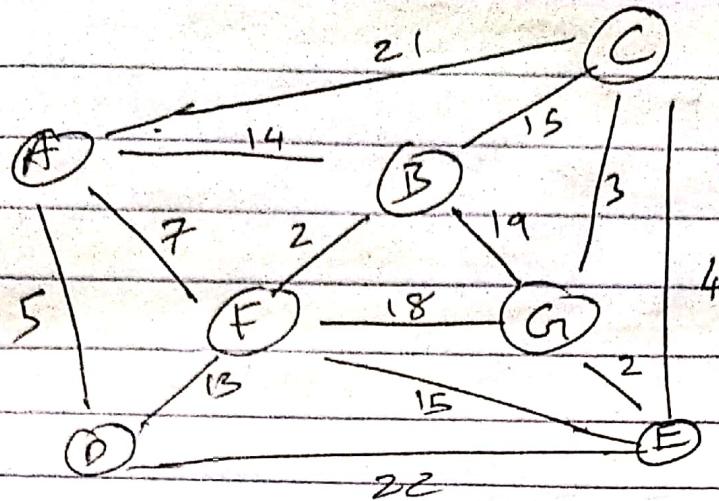
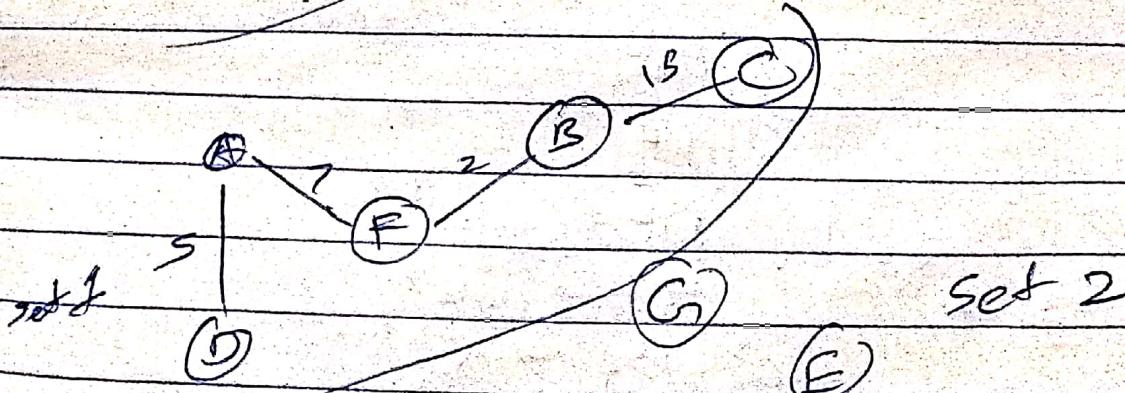
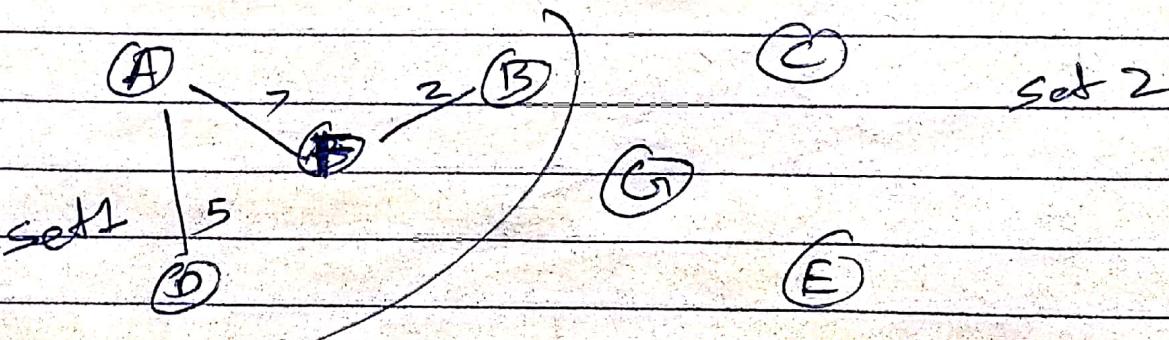
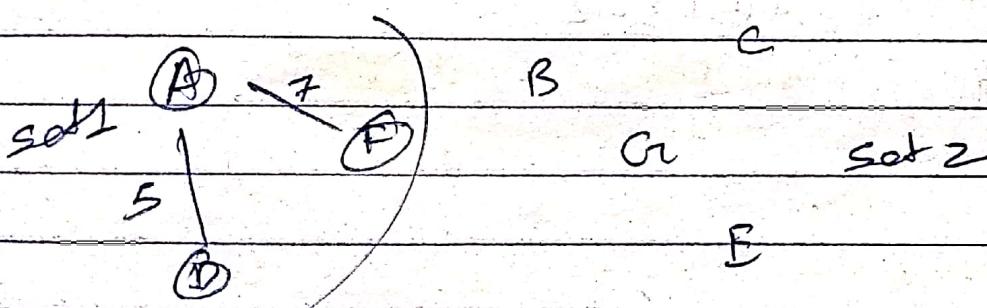
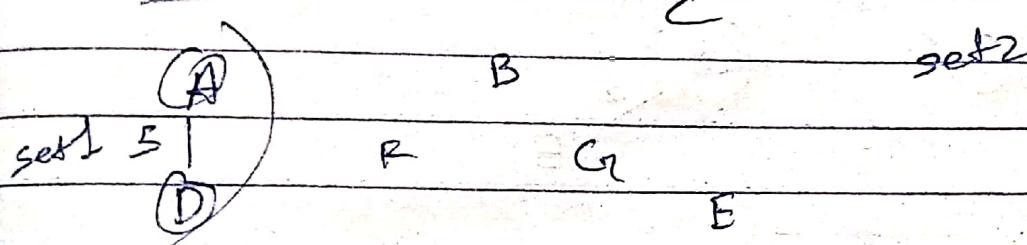
BT19EEE096



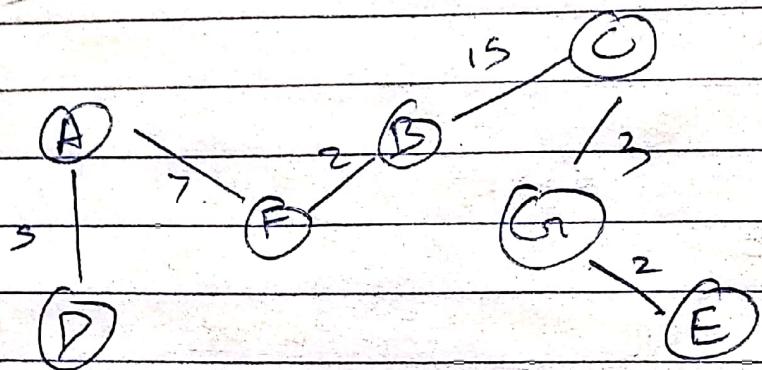
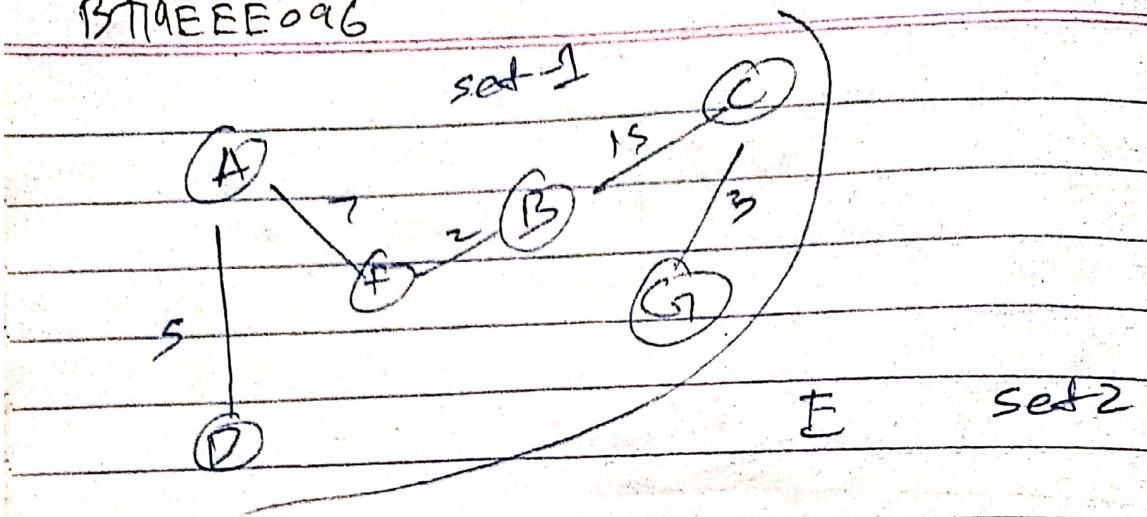
MST



$$\begin{aligned} \text{MST} &= 10 + 25 + 22 + 12 + 16 + 14 \\ &= \underline{\underline{99}} \end{aligned}$$

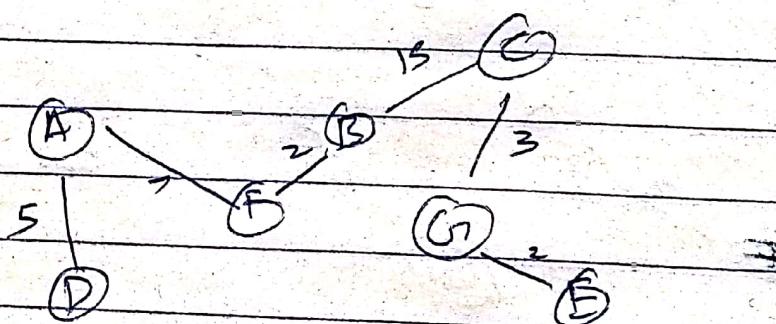
Q. 3)a) PRIM

BT9EEE096



$$\text{MST} = 5 + 7 + 2 + 15 + 3 + 2 \\ = 34$$

b) kruskals



Order

BF

CE

GC

CE  $\rightarrow$  cycle X

1) AD

2) AF

DF  $\rightarrow$  cycle X

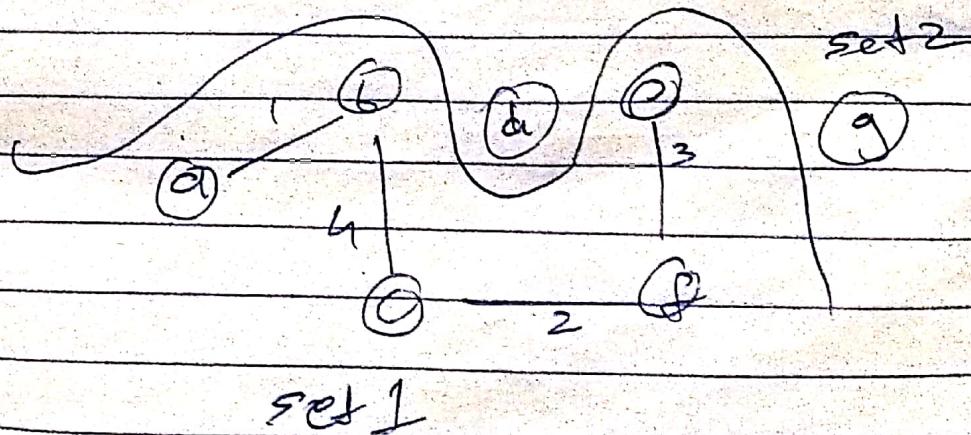
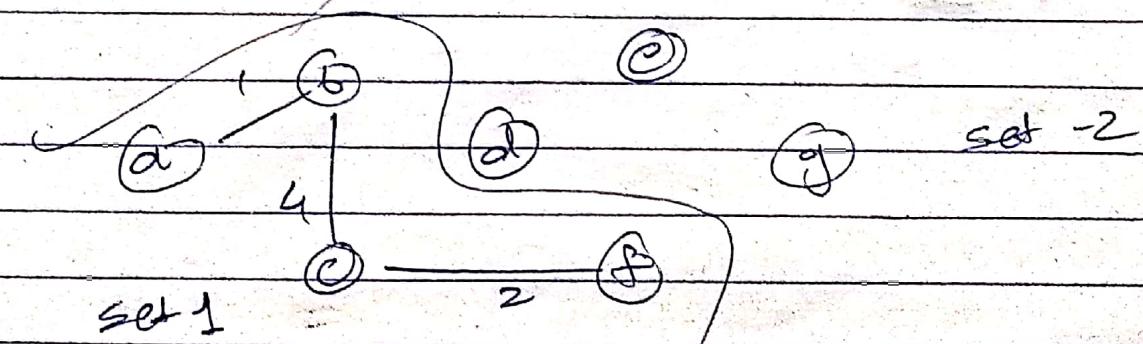
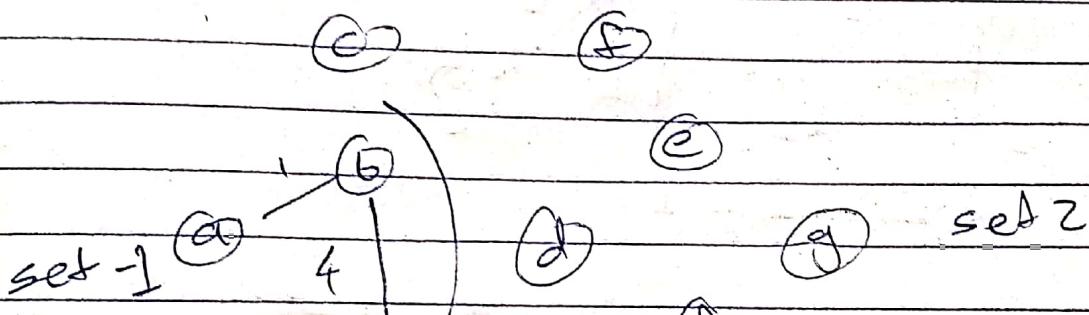
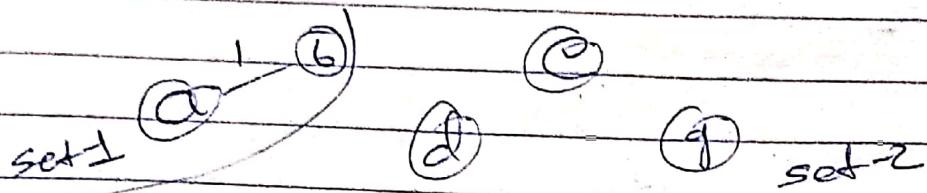
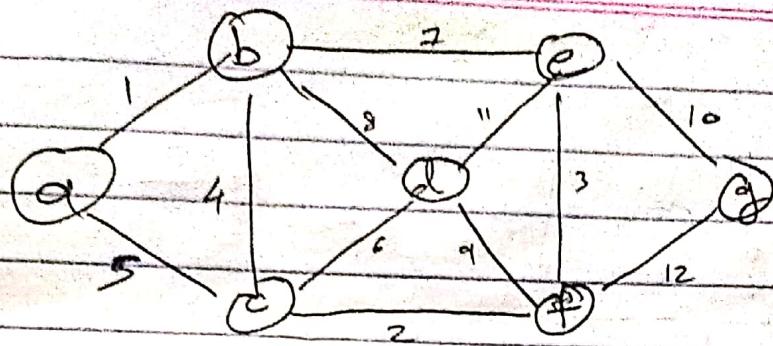
AB  $\rightarrow$  cycle X

3) BC  $\rightarrow$  15

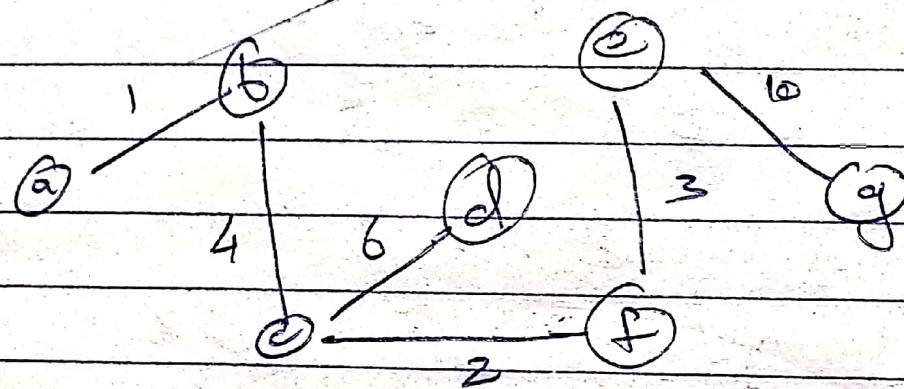
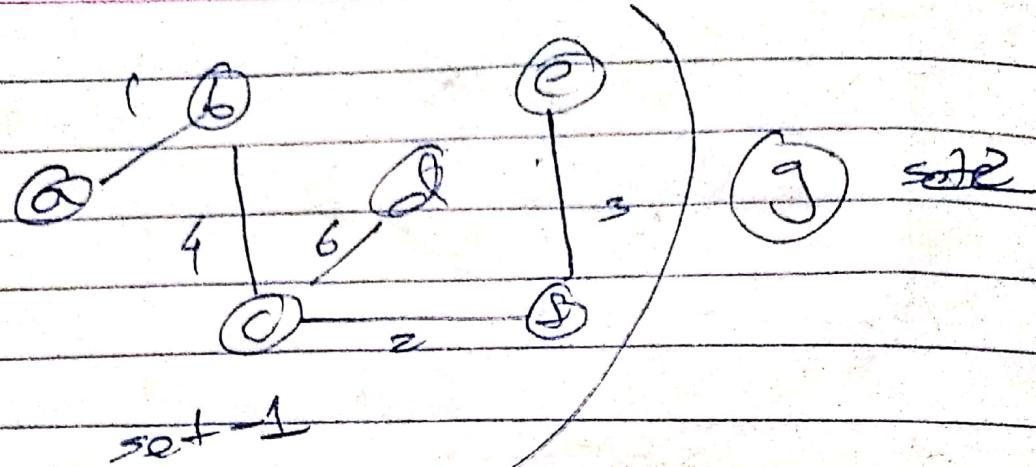
MST = 34

BT79EE046

(A)



BT19EEE096

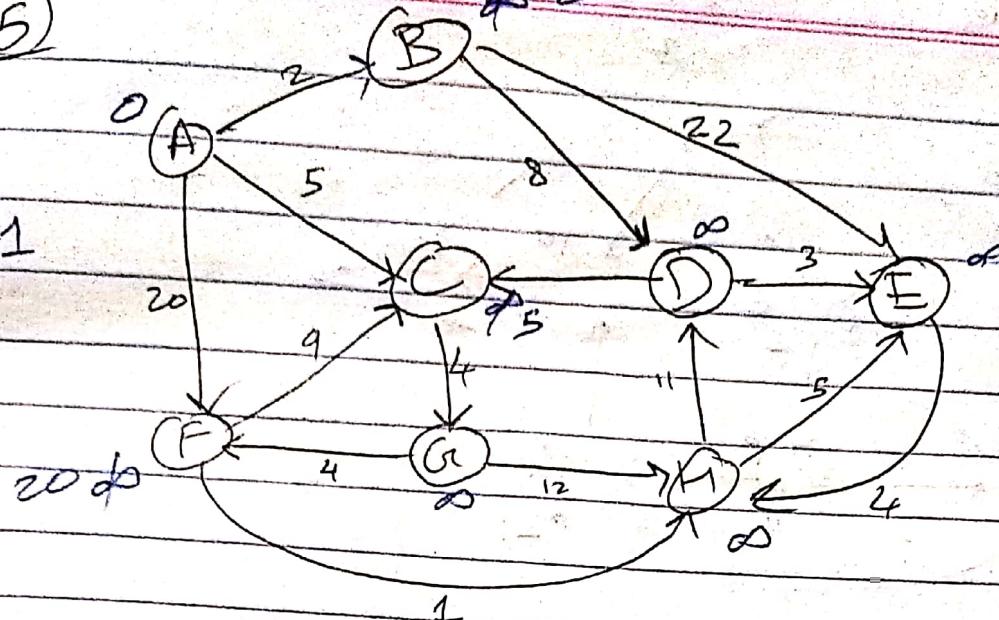


$$\text{MST} = 1 + 4 + 6 + 2 + 3 + 10$$
$$= \underline{\underline{26}}$$

B19E E E 096

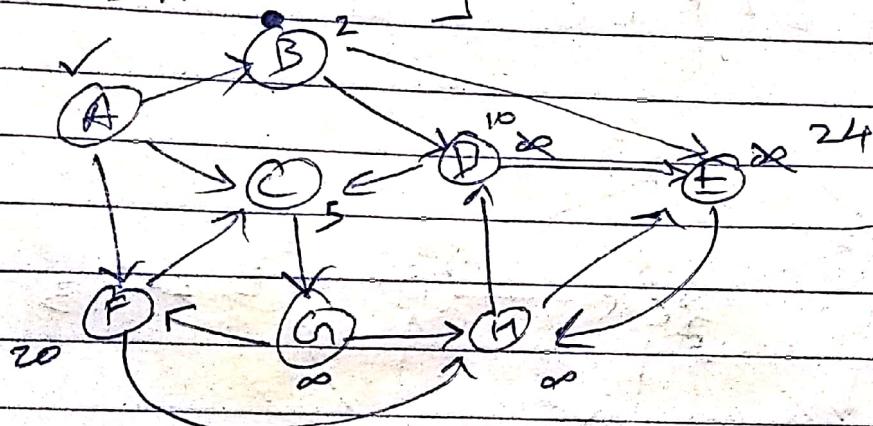
(35)

Step-1



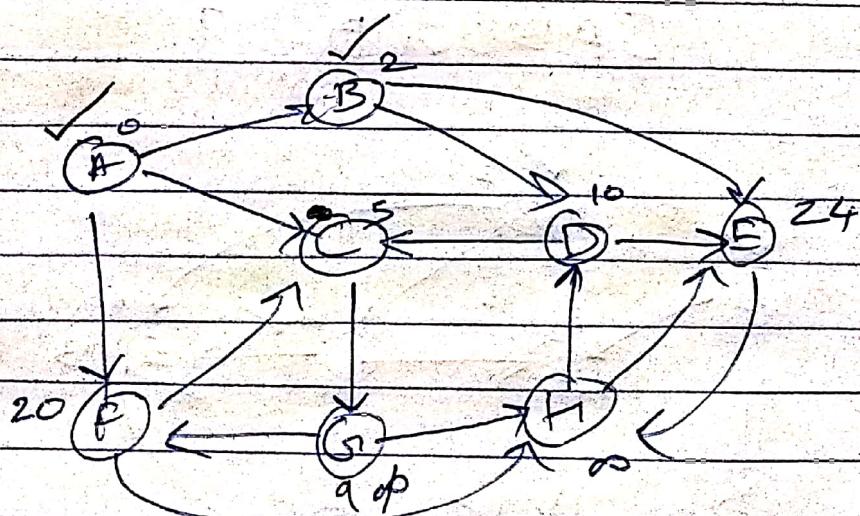
[A]

Step-2



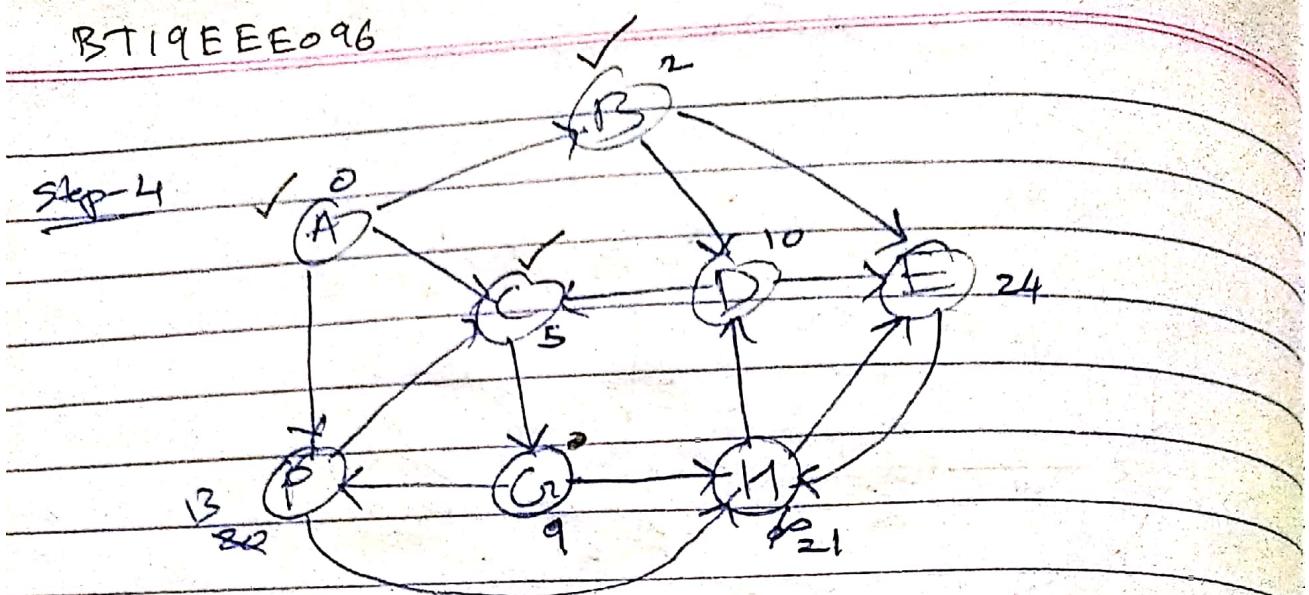
[ABC]

Step-3

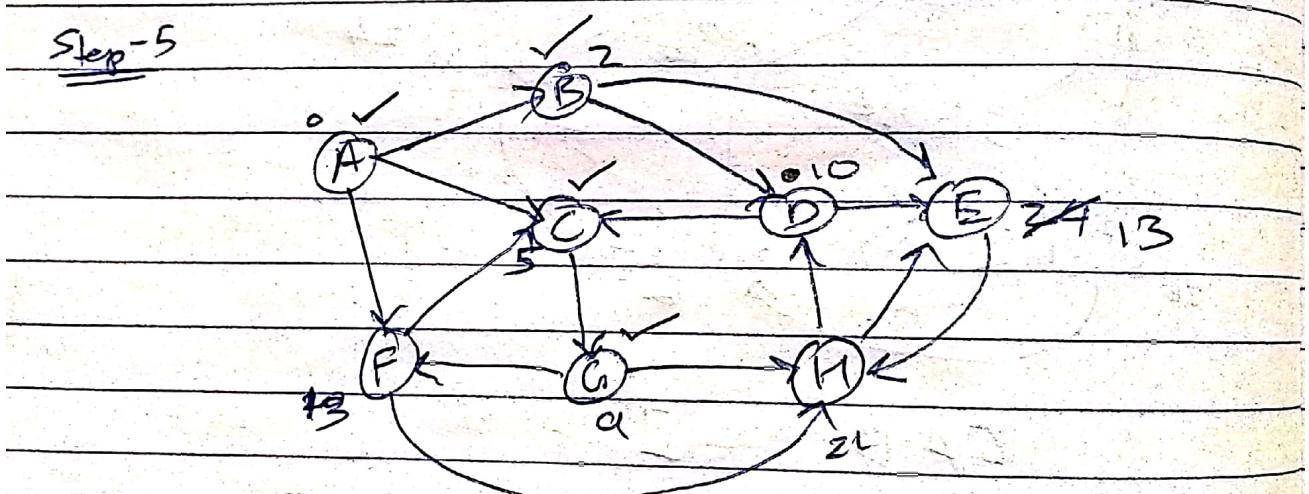


[ABC]

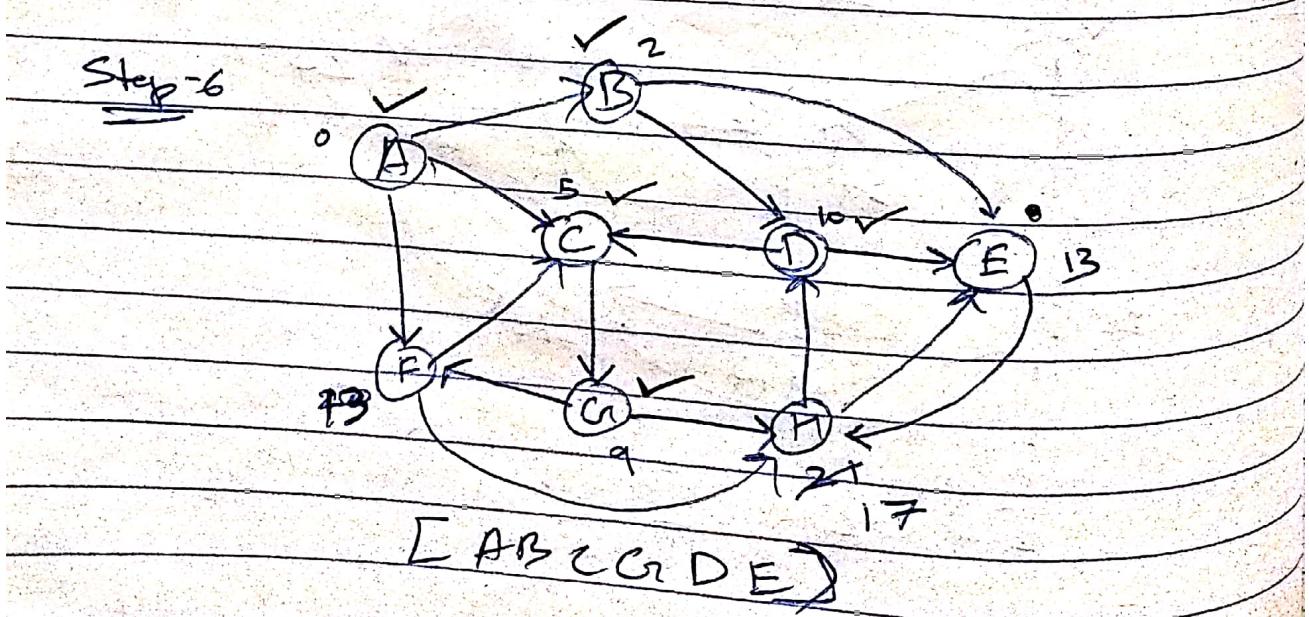
BT19EEE096



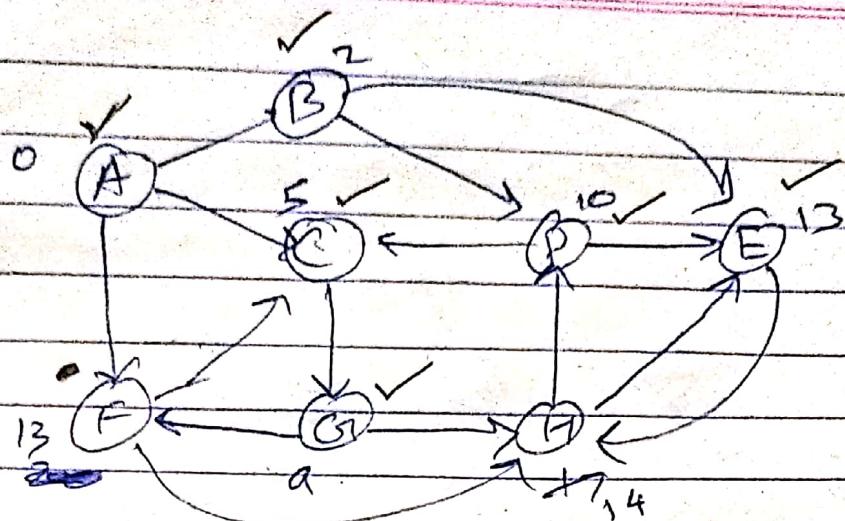
[ A B C C<sub>1</sub> ]



[ A B C C<sub>1</sub> B ]

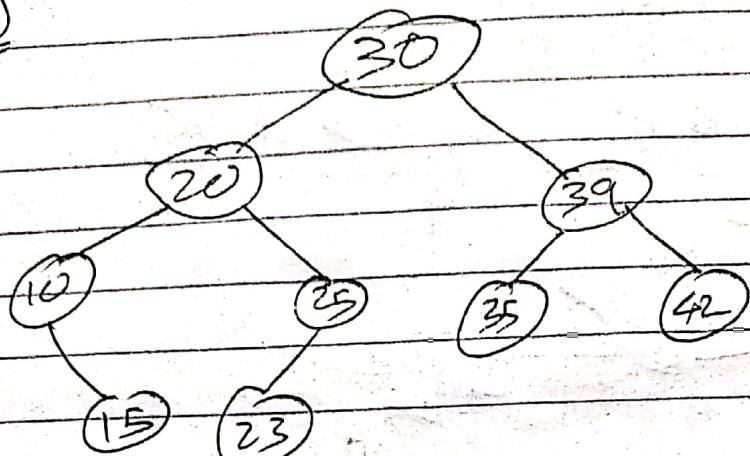
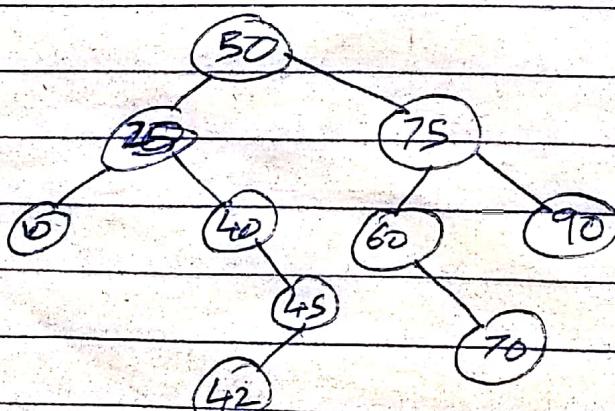


[ A B C C<sub>1</sub> D E ]

Step - 7

[A B C G D E F H]

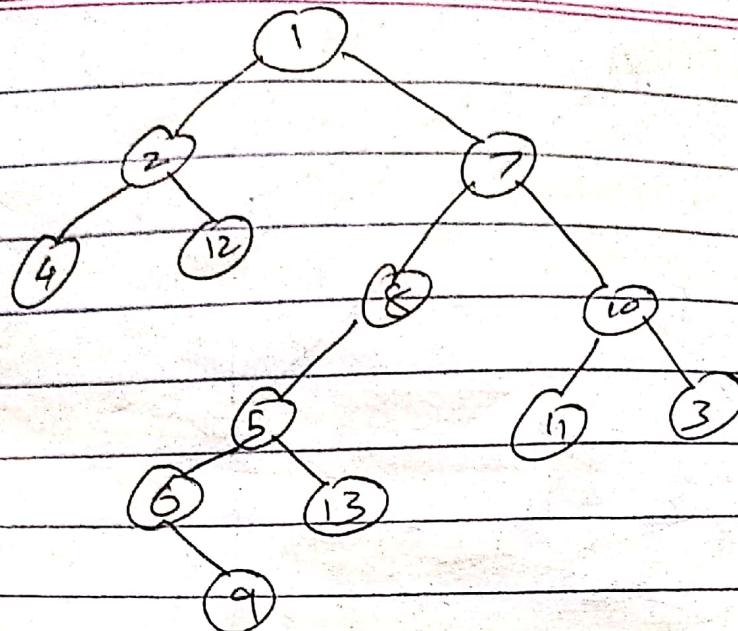
[A B C G D E F H]  $\rightarrow$  Order of verticesShortest PathB  $\rightarrow$  A - BC  $\rightarrow$  A - CD  $\rightarrow$  A - B - DE  $\rightarrow$  A - B - D - EF  $\rightarrow$  A - C - G - FG  $\rightarrow$  A - C - GH  $\rightarrow$  A - C - G - F - H

Q. 6)1) Preorder:  $\rightarrow$  root  $\rightarrow$  left  $\rightarrow$  right $\therefore 30, 20, 10, 15, 25, 23, 39, 35, 42$ 2) Postorder:  $\rightarrow$  left  $\rightarrow$  right  $\rightarrow$  root $\therefore 15, 10, 23, 25, 20, 35, 42, 39, 30$ 3) Inorder:  $\rightarrow$  left  $\rightarrow$  root  $\rightarrow$  right $\therefore 10, 15, 20, 23, 25, 30, 35, 39, 42$ Q. 7)Ans  $\Rightarrow$ 

This is binary S. tree or left node of root nodes are less than root and right nodes are all greater than root and also subroots left child are also less than root and right child greater than root.

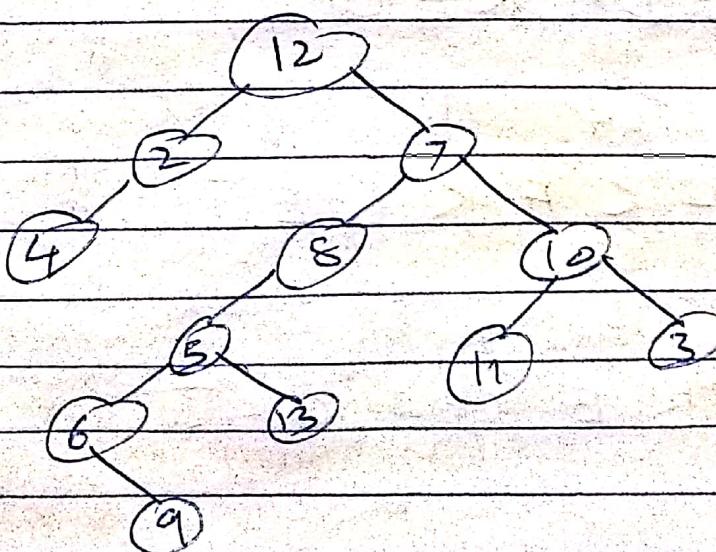
BST deletion

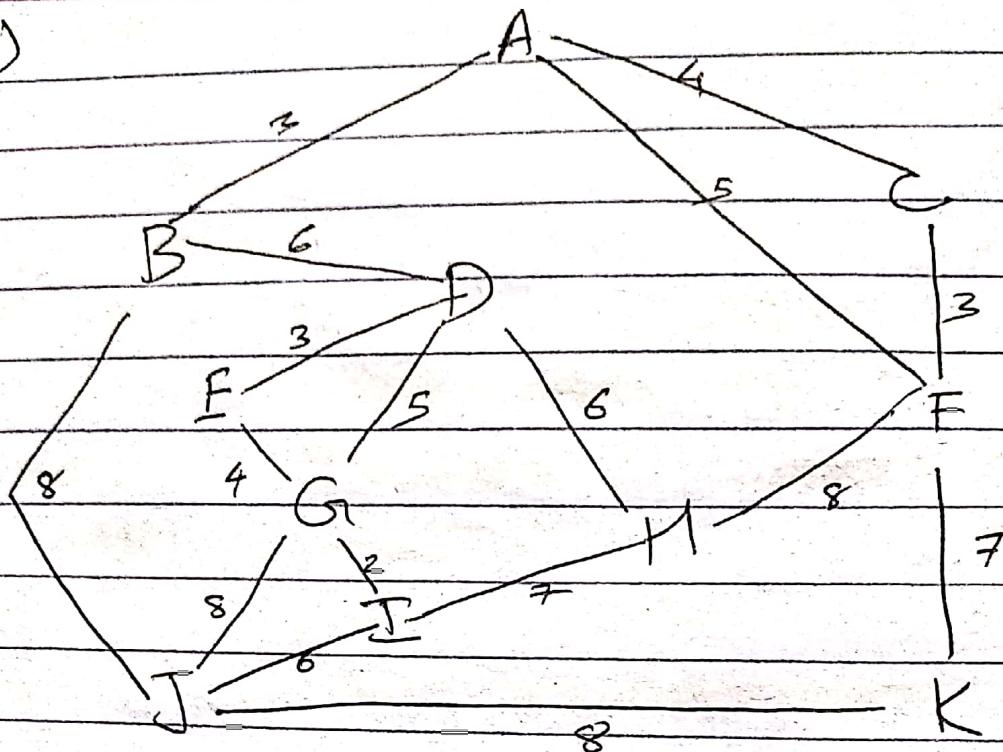
(S8)



To delete the node we need to find predecessor, the node having value greatest in left subtree which means rightmost node in the left subtree.

∴ The new node will be 12  
and BST will look like-



Q9)

a) DFS starting at A

$$A \rightarrow B \rightarrow D \rightarrow E \rightarrow G \rightarrow I \rightarrow T \rightarrow H \rightarrow F \rightarrow C \rightarrow K \rightarrow J$$

b) BFS starting at A

$$A \ B \ C \ F \ D \ I \ H \ K \ R \ E \ G \ T$$

c) DFS starting at H

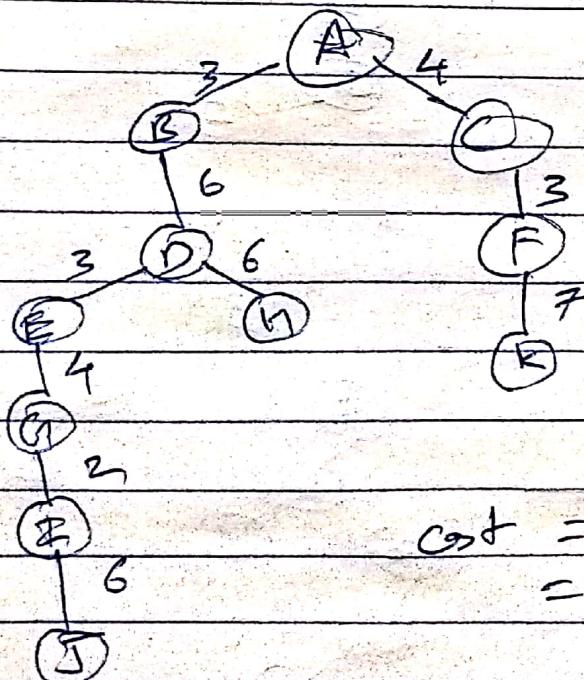
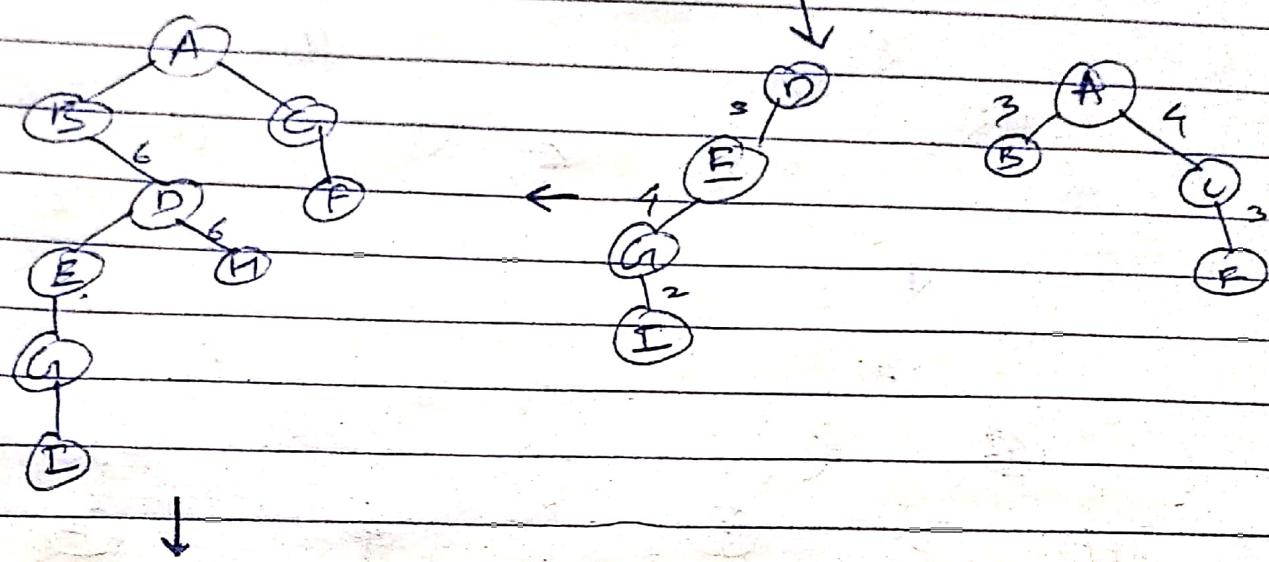
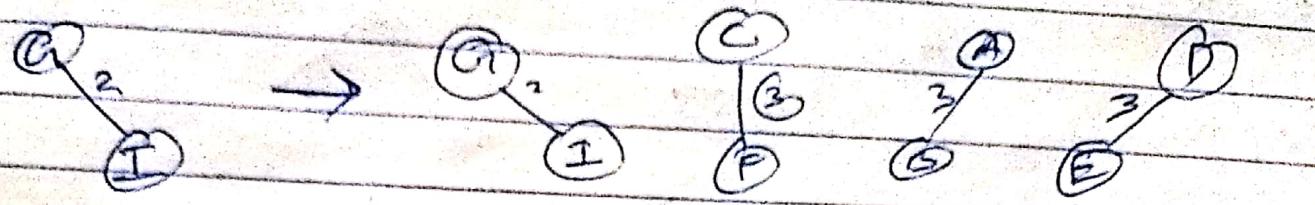
$$H \ D \ B \ A \ C \ F \ K \ G \ E \ T$$

d) BFS starting at H

$$H \ D \ F \ I \ B \ E \ G \ A \ C \ K \ J$$

BTP EEE oag

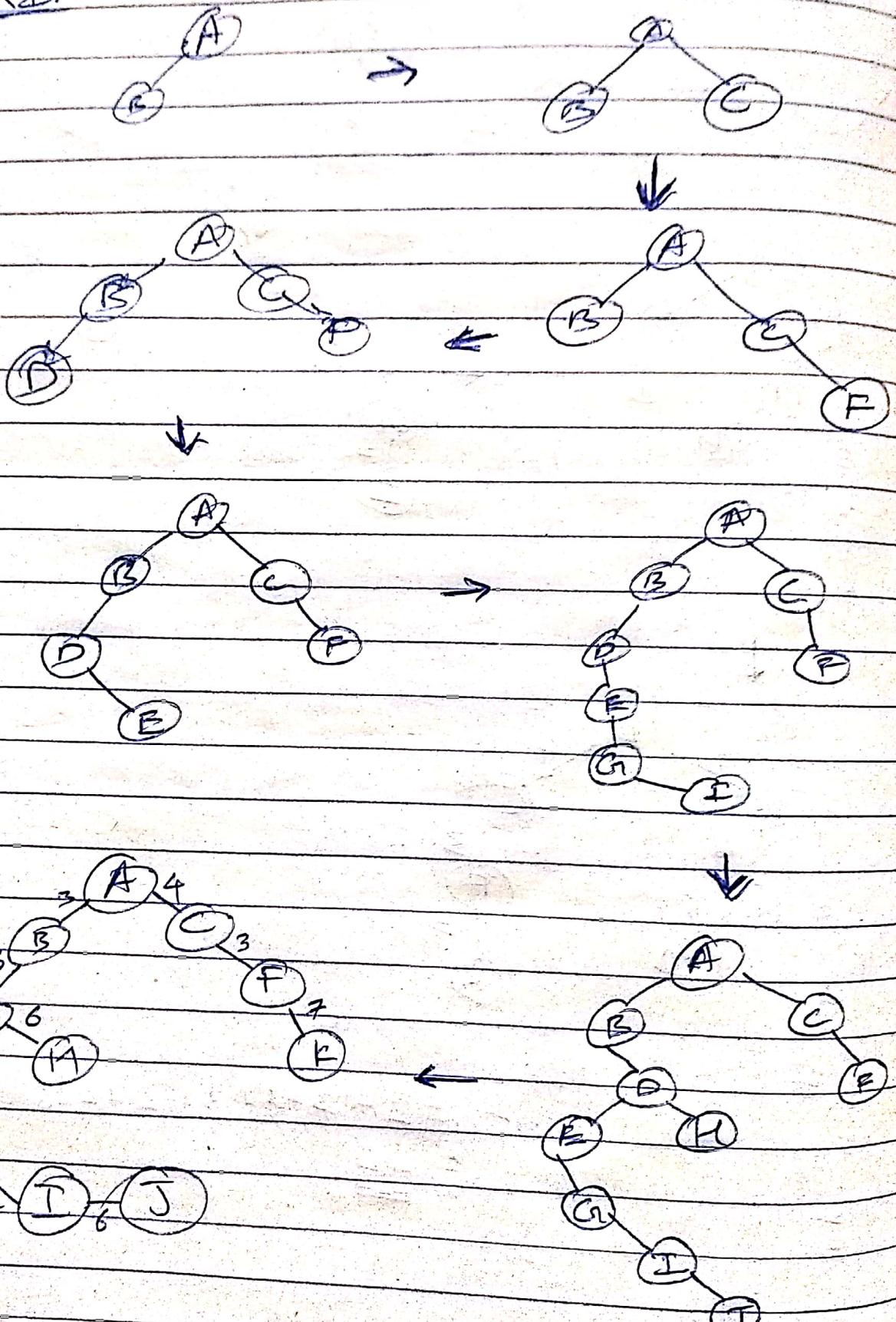
c) Kruskal



$$\text{Cost} = 2 + 3 + 3 + 3 + 4 + 4 + 6 + 6 + 6 + 7 \\ = 44$$

BST19EEEoAG

a) PRIM



$$\begin{aligned} MST &= 3+6+6+3+4+2+6+4+3+7 \\ &= 44 \end{aligned}$$

g) Dijkstra ( $A \rightarrow I$ )

	A	B	C	D	E	F	G	H	I	J	K
A	0	$\infty$	$\infty$	0	0	$\infty$	0	0	0	0	0
B	0	3	4	1	0	5	0	0	0	0	0
C	0	3	4	9	0	5	0	$\infty$	11	$\infty$	
F	0	3	4	9	0	5	0	$\infty$	11	$\infty$	
D	0	3	4	9	12	5	14	13	$\infty$	11	12
J	0	3	4	9	12	5	14	13	$\infty$	11	12
E	0	3	4	9	12	5	14	13	17	11	12
K	0	3	4	9	12	5	14	13	17	11	12
H	0	3	4	9	12	5	14	13	17	11	12
G	0	3	4	9	12	5	14	13	17	11	12
I	0	3	4	9	12	5	14	13	16	11	12

Shortest Path from A to I

$$A \xrightarrow{3} B \xrightarrow{6} D \xrightarrow{5} G \xrightarrow{2} I$$

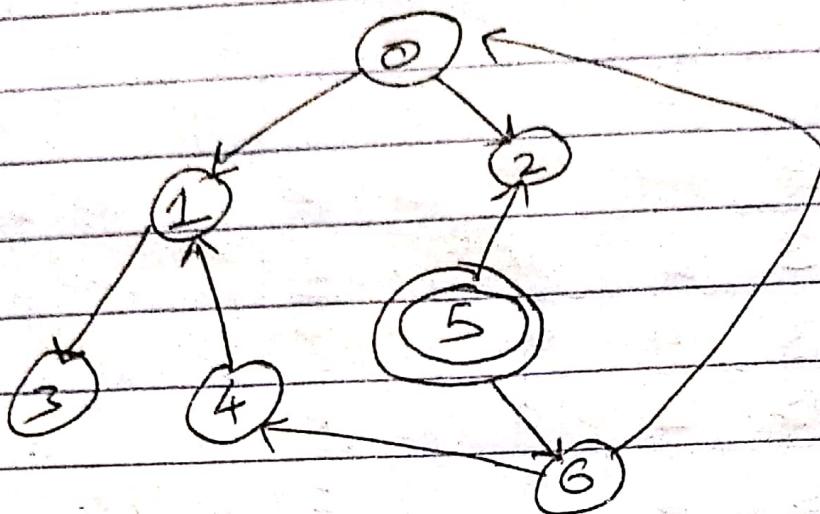
Ques)

→ 1) Connect all n departments of VNIT by communication network

→ 2) Find Minimum Spanning Tree (MST) using PRIM's or Kruskal's algorithm

→ 3) Adding all weights will give us minimum cost.

(Q11)



- An: D Choose any vertex as a source vertex  
 2) Perform DFS traversal of the graph

~~If there exists another vertex then~~

→ After performing DFS if all the values in visited array == true.

→ source is mother vertex.