Name :- Sayed Farwoon

ID :- 12851

Subj :- operation Research

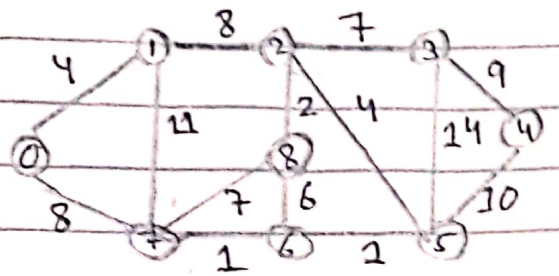
Final term

Teacher :- Saif-ullah jan,

Class time :- wednesday

(1)

Q4 For the following graph, find the minimum spanning three using Kruskal's algorithm. [10



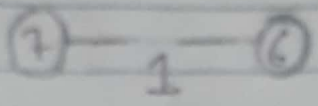
The graph contains 9 vertices and 14 edges. So, the minimum spanning three formed will be having (9-1)=8 edges.

After sorting		
Weight	Src	Dest
1	7	6
2	8	2
2	6	5
4	0	1
4	2	5
6	8	6
7	2	3
7	7	8
8	0	7
8	1	2
9	3	4
10	5	4
11	1	7
14	3	5

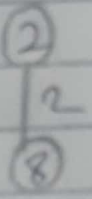
2

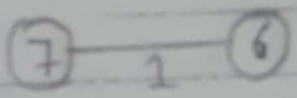
Now pick all edges one by one from sorted list of edges

1. Pick edge 7-6: No cycle is formed include it.

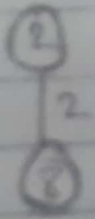


2. Pick edge 8-2: No cycle is formed include it.

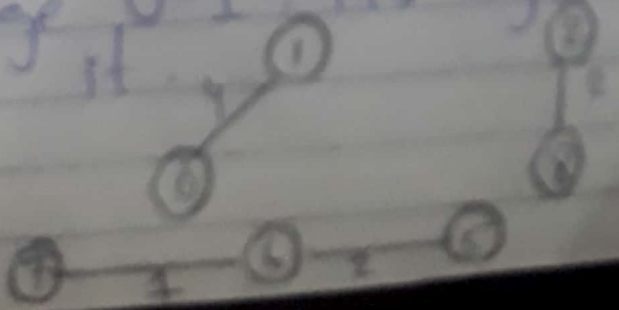




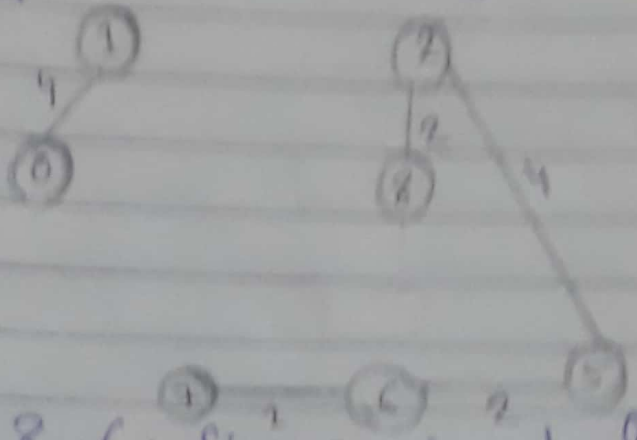
3. Pick edge 6-5: No cycle is formed, include it.



4. Pick edge 0-1: No cycle is formed, include it.

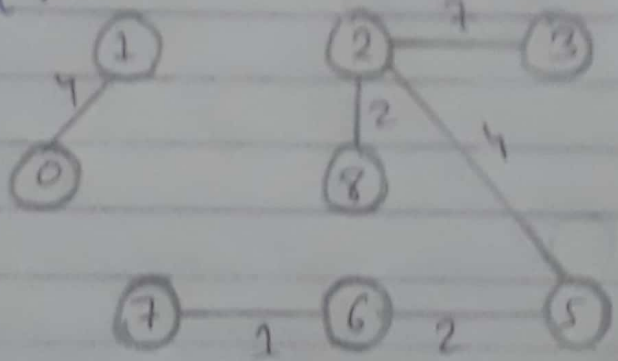


5. Pick edge 7-5: No cycle is formed include it.



6. Pick edge 8-6: Since including this edge results in cycle, discard it.

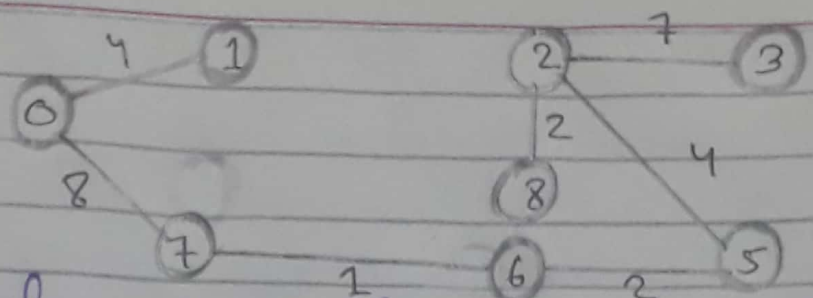
7. Pick edge 2-3: No cycle is formed, include it.



8. Pick edge 7-8: Since including this edge results in cycle, discard it

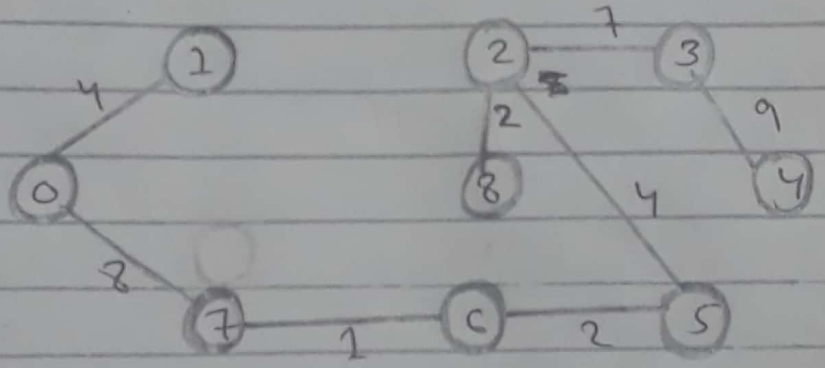
9. Pick edge 0-7: No cycle is formed include it.

Next pg



10. Pick edge 1-2: Since including this edge results in cycle, discard it.

11. Pick edge 3-4: NO cycle is formed, include it,



Since the number of edge include equals (V-1), the algorithm stops here.

(15) Write a detail note on operation Research in your professional life?

(5) Ans 1) You can use your analytical skills and your creativity:

* Whether your background is math, software engineering computer science or an industry such as health care, government or military there is job in operation Research for you.

2- You have the opportunity to solve real world problems:-

* These problems matter to organized and how can impact. In areas such as health care public policy. You can truely change people's lives in for better.

3- You have mobility accross industries and career's :-

* can apply your core operation Research skills to almost any industry.

4- You don't have to subscribe to a dominent world view:

* operation Research has no single mode of professional practice. So you have never to get bore.

5- You become a better strategist :-

* The operation Research disipline looking at problems erecting models and setting up anaylsis that point to better options and results.

6- You become an essential link between technology department and organizational management.

7- You can make great living :-

* The avg starting Salary for an operation Research professional is $60,000 to $ 70,000 and it's easy to move upto $100,000 in finance you can make up to $300,000 or more.

* You're not part of a fad:-

* the diverse technique's of

operation Research including mathematical programming. So you have constantly have the opportunity to learn new things.

9- You can have fun at work.

* In many professional's career's little of what you create is simple and implemented. The ability of O.R to have an impact save millions

(even hundred's of millions) of dollar's means that companies put it's solution to use.

- You're extremely relevent today;

* Many organizations find themselves awash in data with little understanding of how to leverage that data for better results. tool's and approaches for harvesting insight from

data to make dramatic improvements throughout the organization.

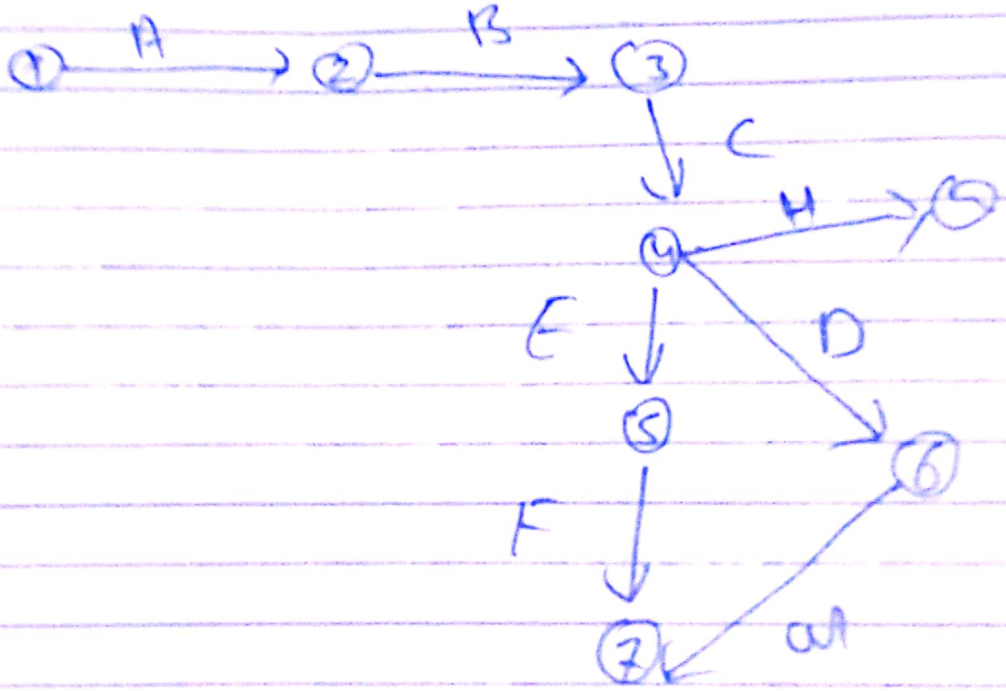
Q2 Activity predecessor optimistic

Ans)			time(o)	time(m)	time(p)
	A	—	4	5	12
	B	A	2	3	4
	C	B	6	7	22
	D	C	4	6	8
	E	C	3	4	5
	F	E	2	4	6
	G	D, F	2	3	4
	H	C	5	7	15

(12)

solution:

a) construct the project Network.



P.T.O

(b)

Activity	Predecessal	o	m	p	mean expected duration
A	—	4	5	12	6
B	A	2	3	4	3
C	B	6	7	22	10
d	C	4	6	8	6
e	C	3	4	5	4
f	E	2	4	6	4
g	D, f	2	3	4	3
h	C	5	7	15	8

Variance

1.77

0.11

7.09

0.44

0.11

0.44

0.11

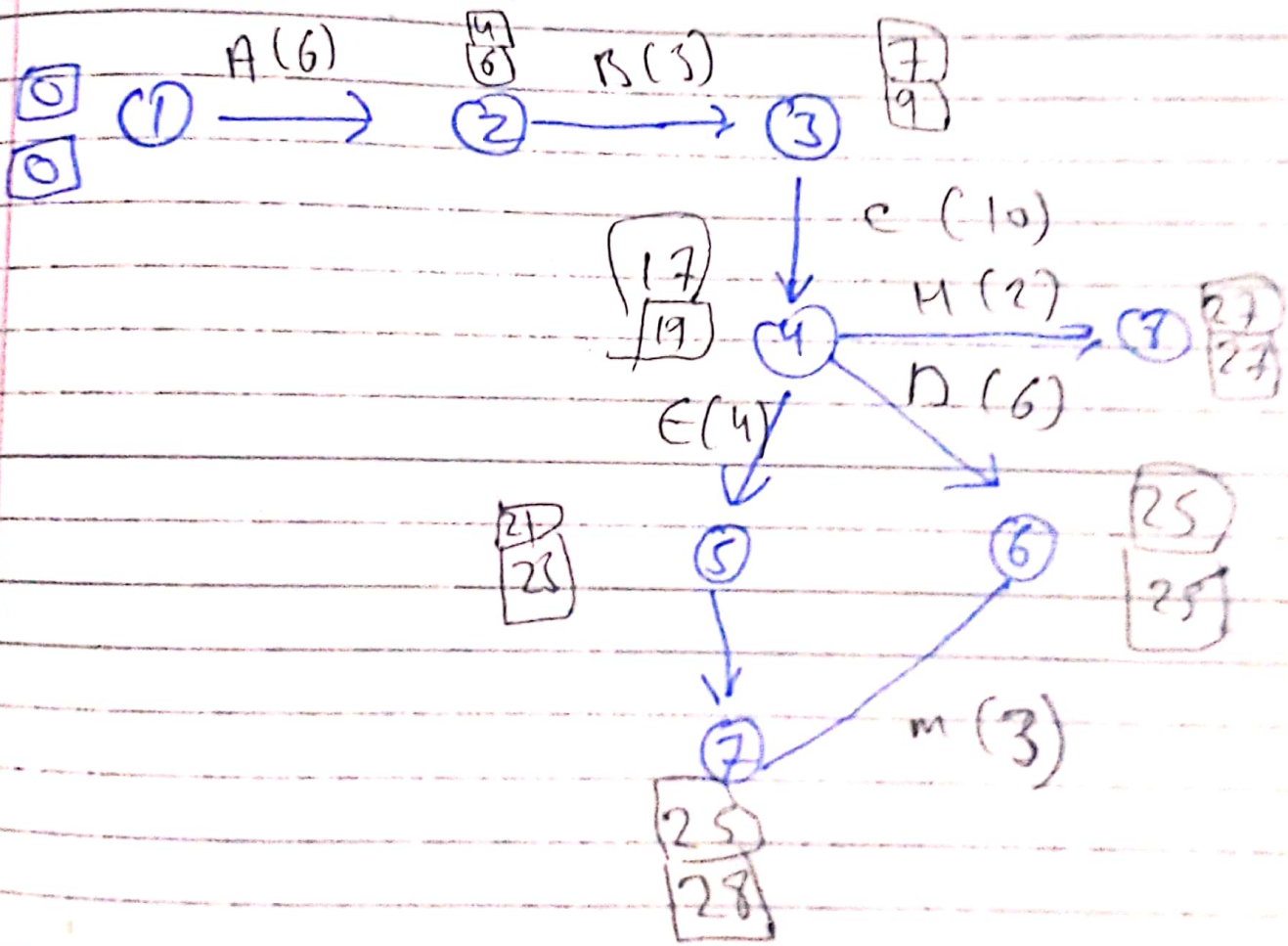
2.76

$$\sigma_g^2 = \left(\frac{15-5}{6}\right)^2 = \left(\frac{10}{6}\right)$$

$$= 2.76$$

3) find the critical path and expected project completion time

critical path



$t_{e7} = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = 3.$

$t_{e8} = \frac{5 + 4(7) + 15}{6} = \frac{5 + 28 + 15}{6} = 8$

Variance (σ^2):-

by formula

$\sigma^2 = \left(\frac{t_p - t_o}{6}\right)^2$

$\sigma_1^2 = \left(\frac{12 - 4}{6}\right)^2 = \left(\frac{8}{6}\right)^2$

$= (1.33)^2$

1.77

$\sigma_2^2 = \left(\frac{4 - 2}{6}\right)^2 = \left(\frac{2}{6}\right)^2$

$= 0.11$

$\sigma_3^2 = \left(\frac{22 - 6}{6}\right)^2 = \left(\frac{16}{6}\right)^2 = 7.09$

(16)

$$6_4^2 = \left(\frac{8-4}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = 0.44$$

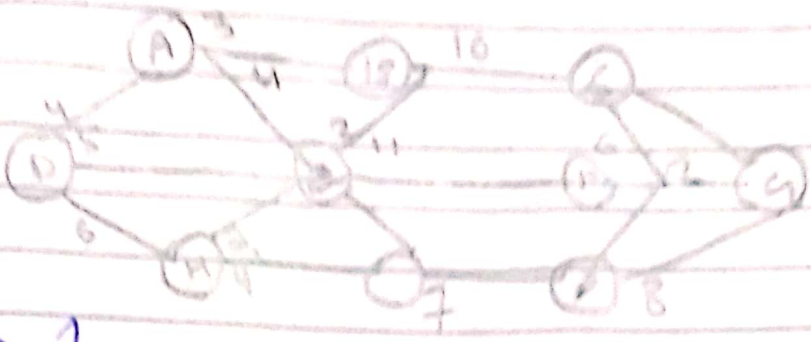
$$6_5^2 = \left(\frac{5-3}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

$$6_6^2 = \left(\frac{6-2}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = 0.44$$

$$6_7^2 = \left(\frac{4-2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

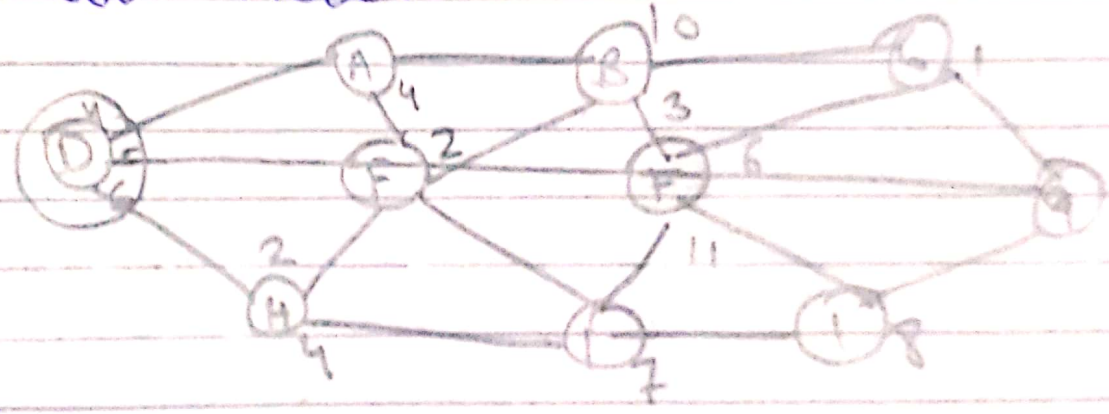
$$6_8^2 = \left(\frac{15-5}{6}\right)^2 = \left(\frac{10}{6}\right)^2 = 2.76$$

(7)

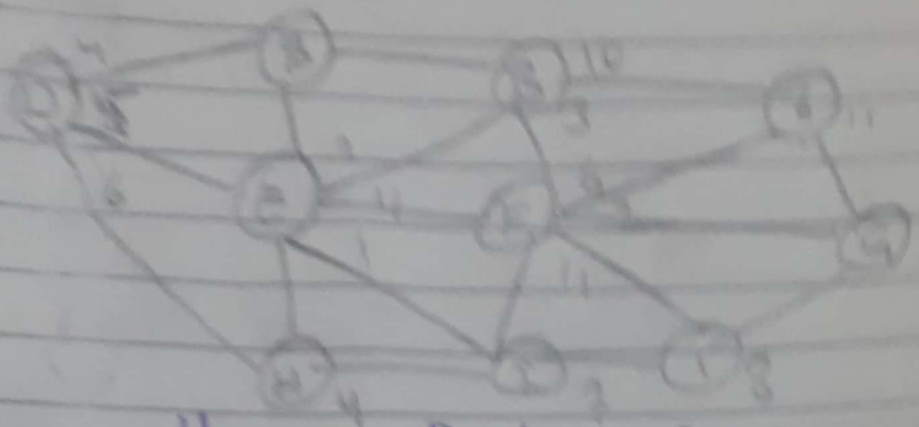


Step 1:- Removing all loops and parallel edges.

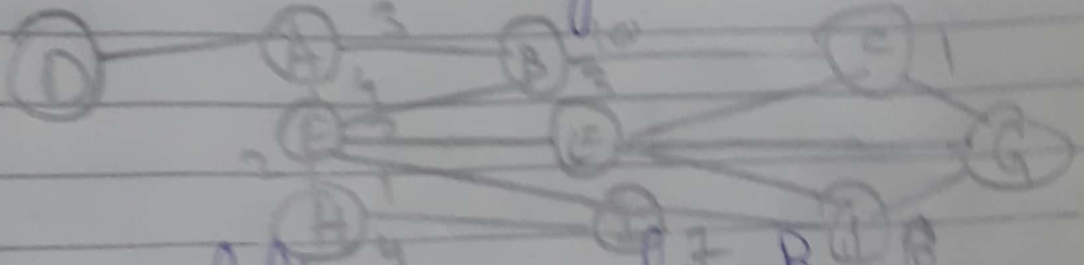
Step 2:- Choosing arbitrary node as root node.



Step 3:- Find the tree

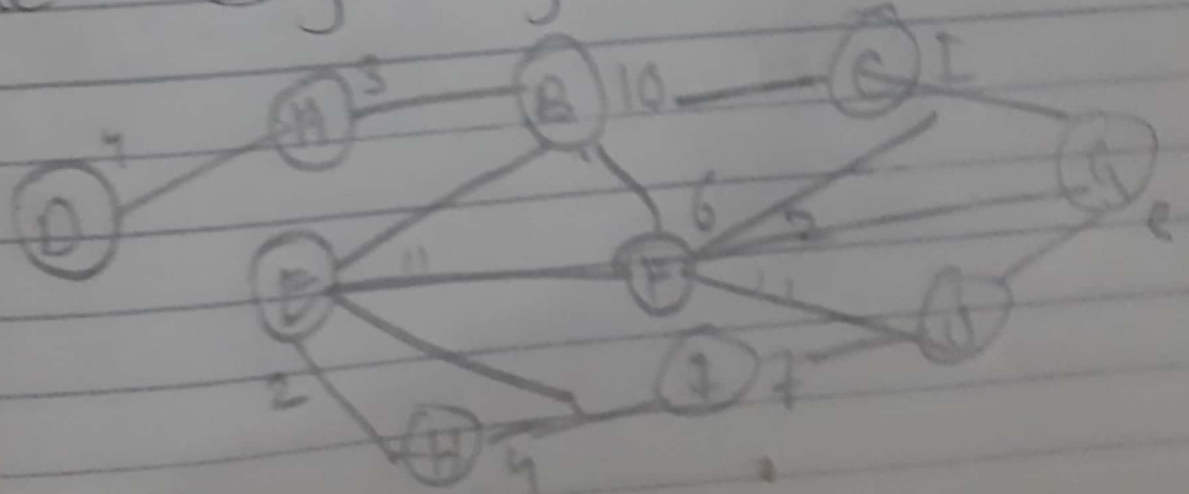


Now the tree D-4, A is treated is one node and we are checking for all edges.



After adding node B

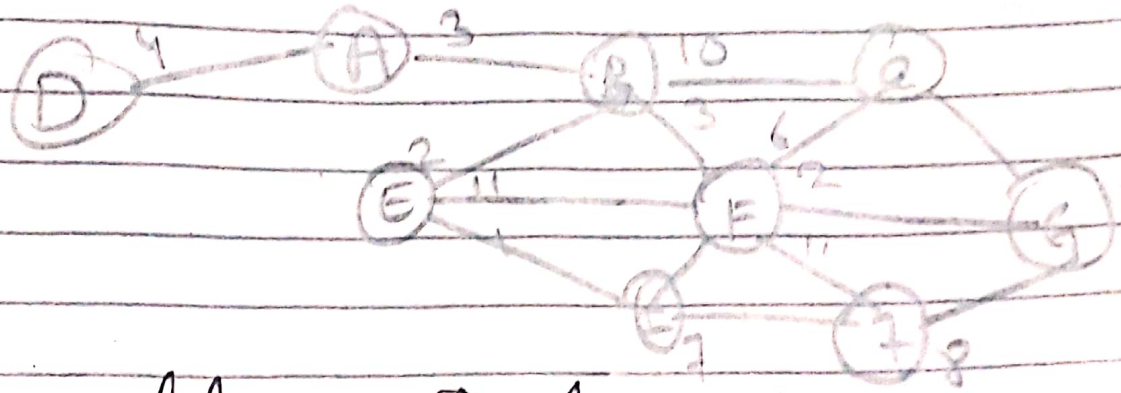
D-4-A-3 tree is formed Now we will again treat it as a node and will check the edge again



19

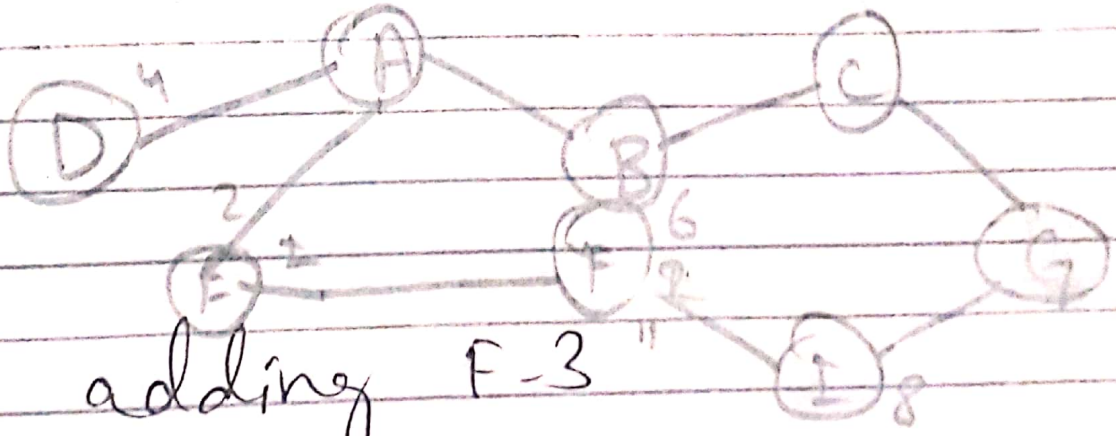
after adding node E

D-4-A-3-F-2



after adding I-1

D-4-D-3-E-2-I-1



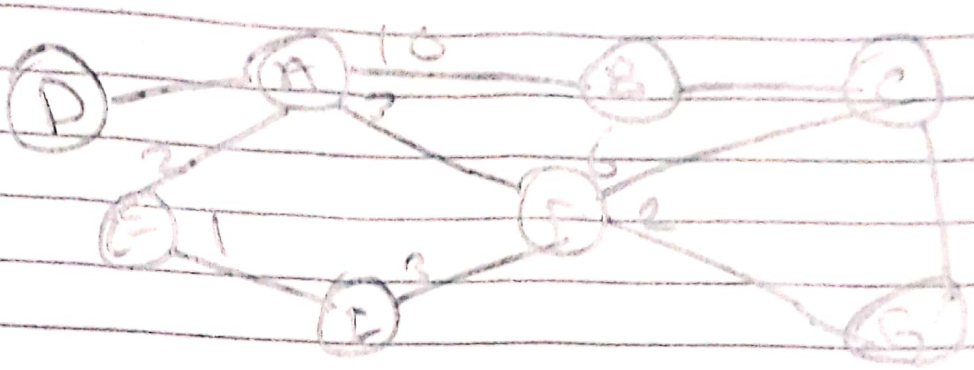
after adding F-3

D-4-A-3-E-2-I-1-F-3

(12) (20)

after adding a node

D-4-A-3-E-2-1-1-F-3-G-2



minimum spanning tree

= 4+3+2+1+3+2.

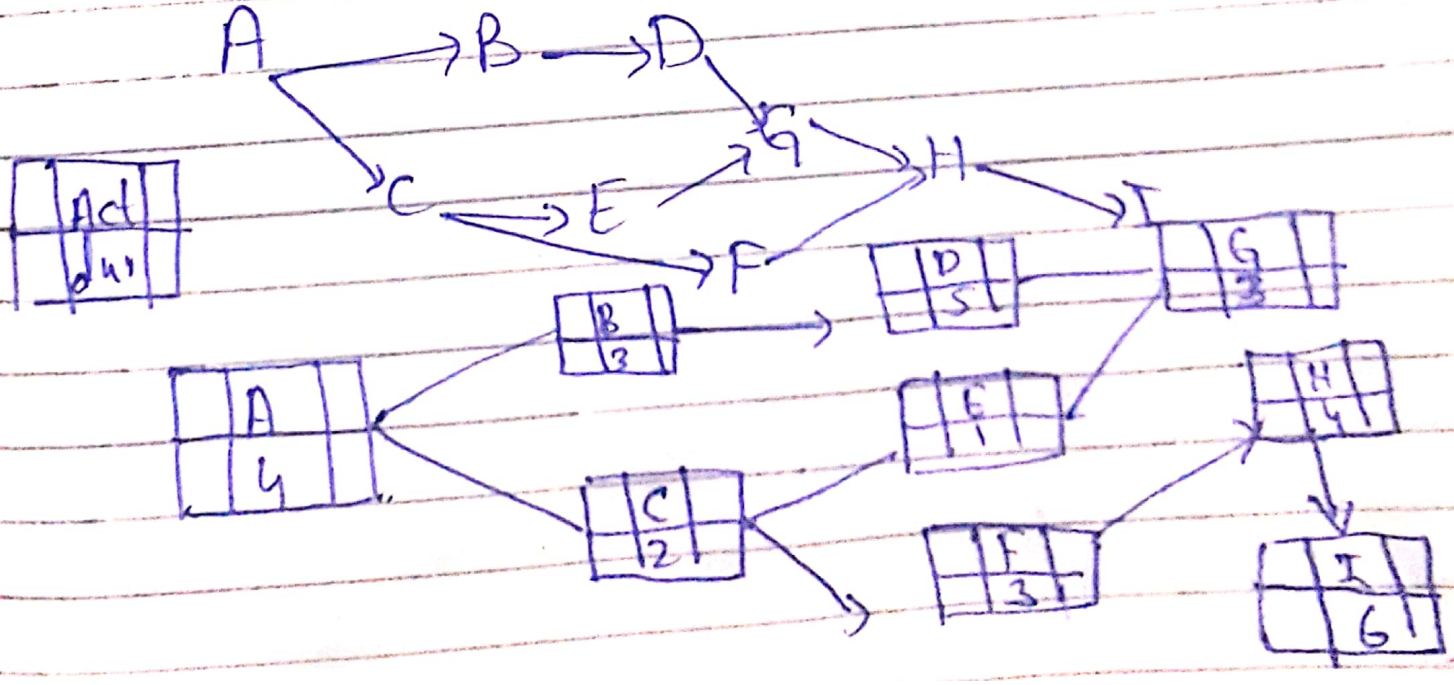
21

Question No → 01

Answer

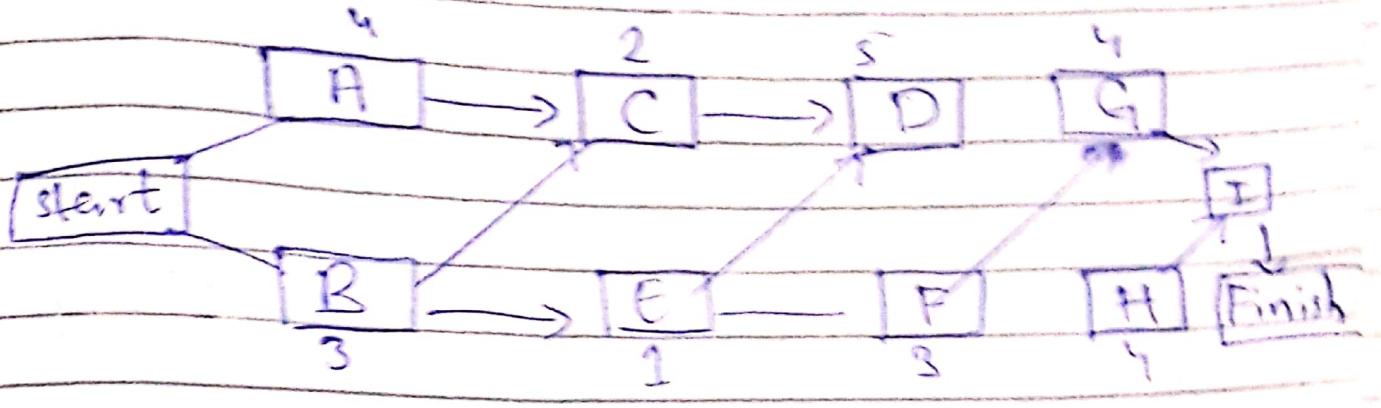
(a) Calculate the CPM Network

Activity	Predecessor	Time
A	-	4
B	A	3
C	A	2
D	B	5
E	B.C	1
F	D,E,C	3
G	D,E,F	4
H	D,E	4
I	H, G	6



(Q No 1)

part (b)



(Question 1 Part - C)

Total Float - TF

TF = LF - EF " Finish Float"

TF = LS - ES " Start Float"

TF