

Name	Safiullah	
ID	#	14677
Program	BS SE	
Section	"B"	
Subject	Operation research	

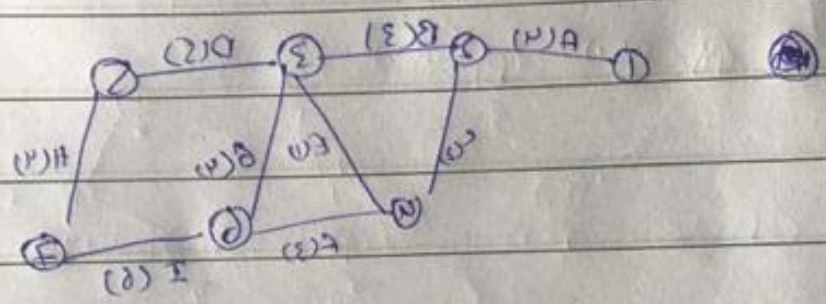
①

Q: (1)

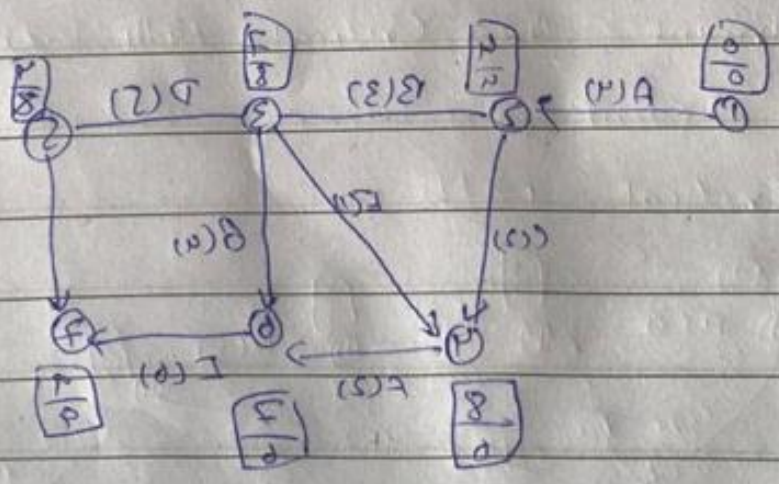
Answer

(a)

Calculate the CPM network



(d)



was from the

$$t_{23} = \max(t_{21} + D_{12}, t_{23})$$

$$\text{for node 1: } t_{21} = 0$$

$$\text{Node 2: } t_{21} = 0 + 0 = 0$$

$$\text{Node 3: } t_{23} = 0 + 0 = 0$$

$$\text{Node 4: } t_{24} = 0 + 0 = 0$$

(2)

M T W T F S

H/W C/W

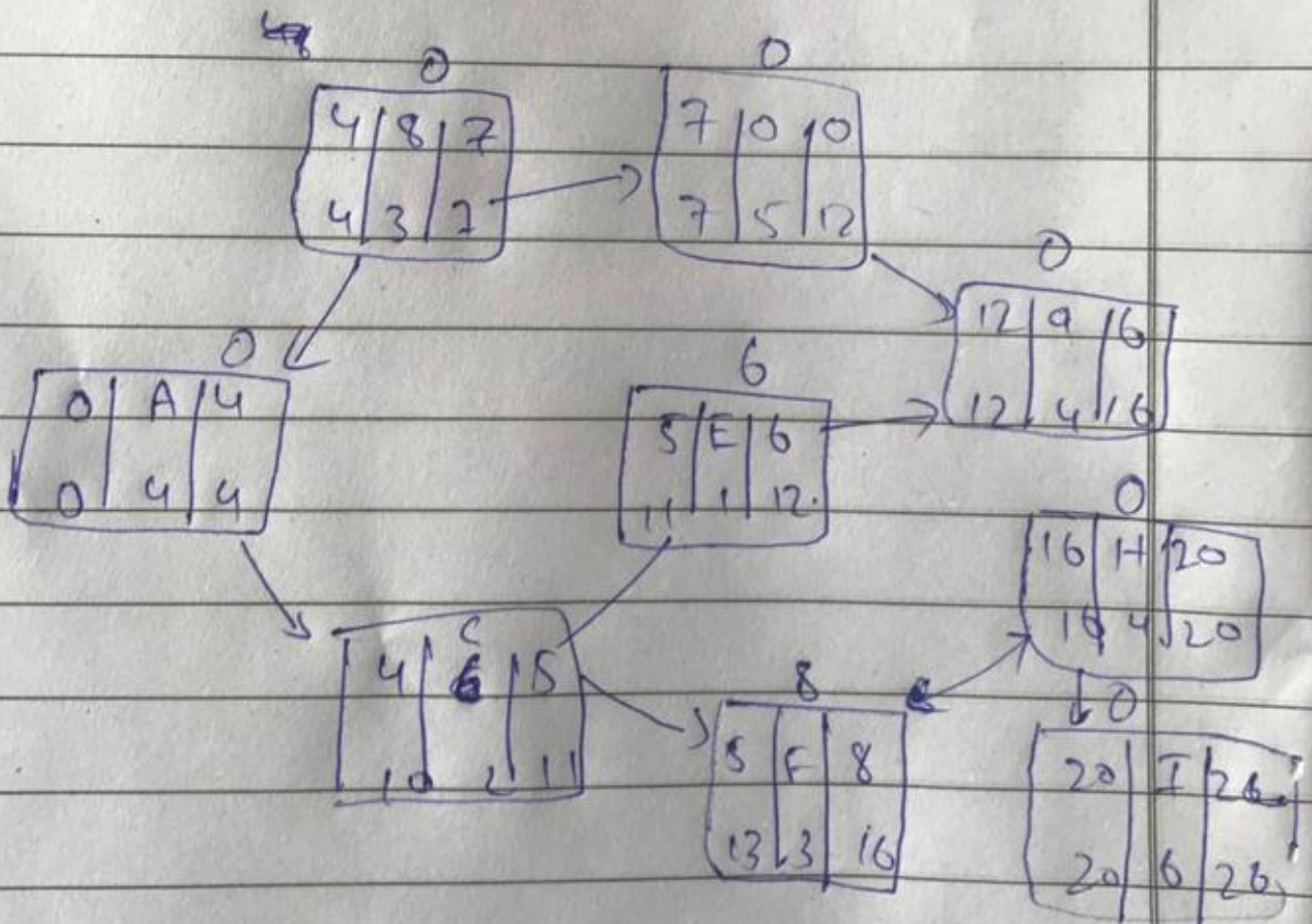
Dated:/...../20.....

$$\text{Node 5} = 3 + 5 = 8$$

$$\text{Node 6} = 3 + 4 = 7$$

$$\text{Node 7} = 5 + 4 = 9$$

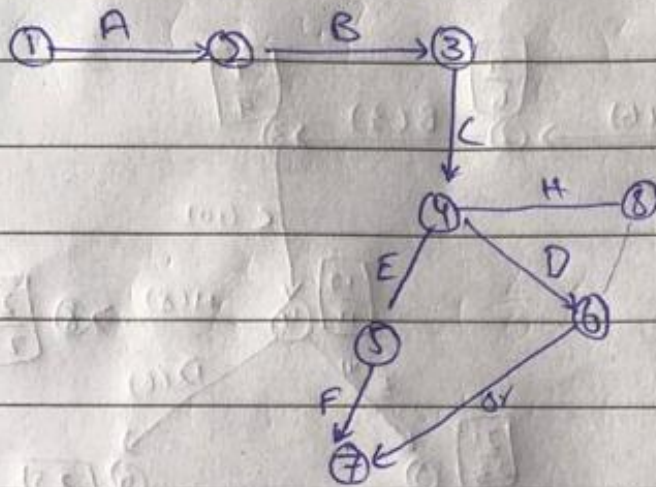
(c)



Q:2

Solution:

Construct the Project network.



(b)

Activity	Predecessor	O	M	P	mean expected duration	variance
A	-	4	5	12	6	1.77
B	A	2	3	4	3	0.11
C	B	6	8	22	10	7.09
D	C	4	6	8	6	0.44
E	C	3	4	5	4	0.11
F	E	2	4	6	4	0.44
G	D, F	2	3	4	3	0.11
H	C	5	7	15	8	2.76

by formula

$$\text{mean } t_{e1} = \frac{t_0 + 4t_m + t_p}{6}$$

$$= \frac{4 + 4(5) + 12}{6} = \frac{4 + 20 + 12}{6} = 6$$

$$t_{e2} = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = 3$$

$$t_{e3} = \frac{6 + 4(8) + 22}{6} = \frac{6 + 32 + 22}{6} = 10$$

$$t_{e4} = \frac{4 + 4(6) + 8}{6} = \frac{4 + 24 + 8}{6} = 6$$

$$t_{e5} = \frac{3 + 4(4) + 5}{6} = \frac{3 + 16 + 5}{6} = 4$$

$$t_{e6} = \frac{2 + 4(7) + 6}{6} = \frac{2 + 16 + 6}{6} = 4$$

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

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

Variance (σ^2):

by formula:

$$\sigma^2 = \frac{(\sum P - t_0)^2}{6}$$

$$\sigma^2_1 = \left(\frac{12-4}{6}\right)^2 = \left(\frac{8}{6}\right)^2 = (1.33)^2 = 1.77$$

$$\sigma^2_2 = \left(\frac{4-2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

$$\sigma^2_3 = \left(\frac{22-6}{6}\right)^2 = \left(\frac{16}{6}\right)^2 = 7.09$$

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

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

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

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

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

6

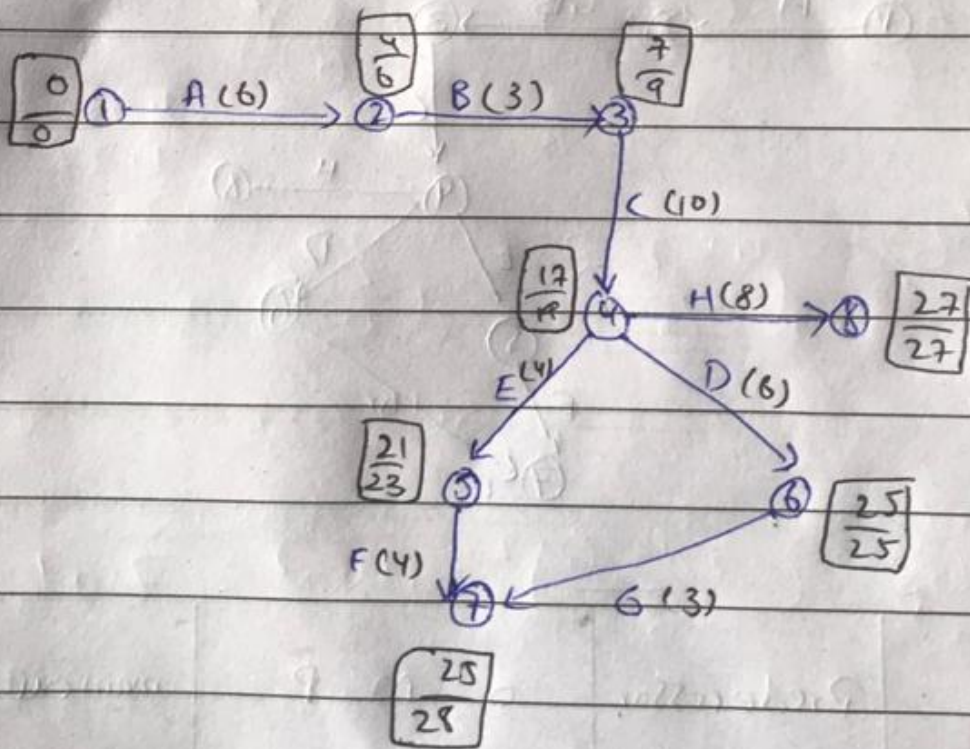
M T W T F S

H/W - C/W

Dated:/...../20.....

(C) Find the critical Path and expected Project completion time.

critical Path



Q. 3

In Prim's Algorithm the idea is simple to create a spanning tree with minimum weight. Also there should be no cycles.

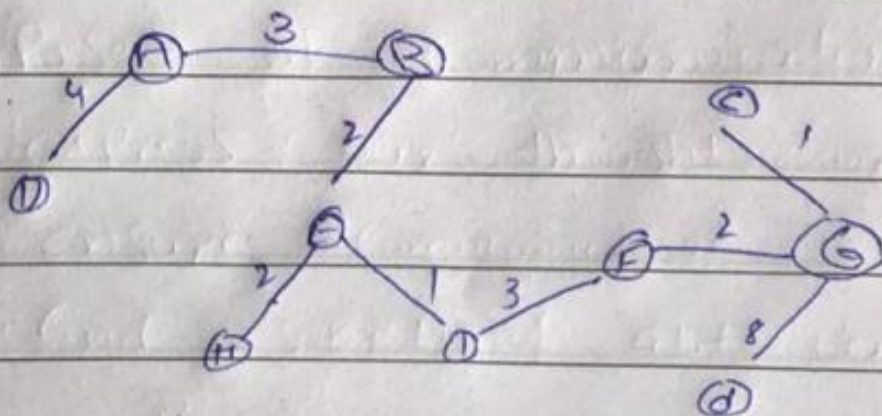
Step (1)

Choose an arbitrary start

Vertex

(1)

keep including connected edges



Question (4)

Ans

The graph containing vertices and 14 edges. The minimum spanning tree formed will be having $(9-1)=8$ edges.

After Sorting:

weight	Src	Dest
1	7	6
2	8	2
3	6	5
4	0	1
5	2	5
6	8	6
7	2	3
8	7	8
9	0	7
10	1	2
11	3	4
12	5	4
13	1	7
14	8	5

9

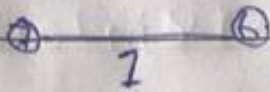
M T W T F S

H/W - C/W

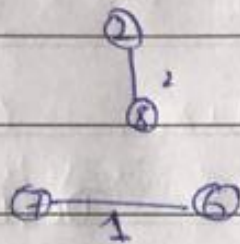
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Now Pick all edges one by one

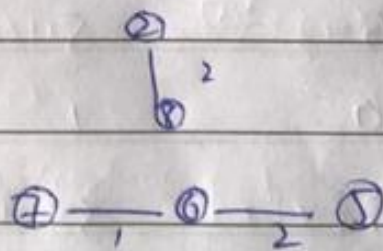
(1) Pick edge 7-6 No edge is formed



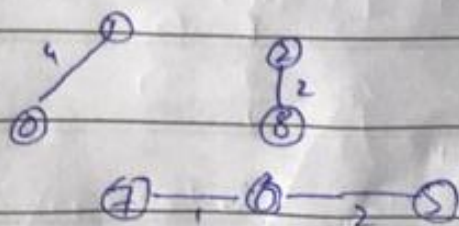
(2) Pick edge 8-2 No edge is formed



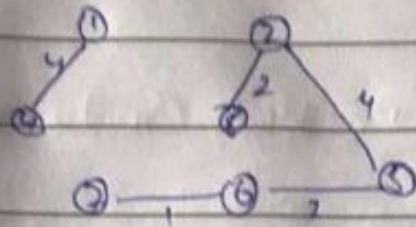
(3) Pick edge 6-5 No edge is formed



(4) Pick edge 0-1 No edge is formed

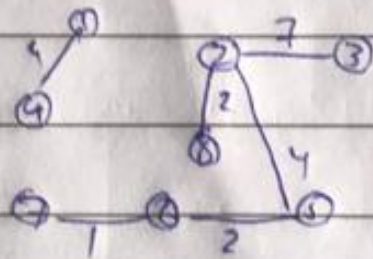


5) Pick edge 2-5 edge is formed



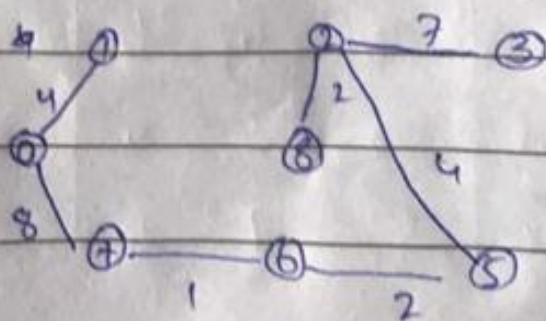
6) Pick edge 3-6 Since including this edge results in cycle

7) Pick edge 2-3 cycle is formed



8) Pick edges 7-8 Since including this edge result in cycle

9) Pick edge 0-7 No edge is formed



Q.5 write detailed note on how this Course (Operation Research) will help you in your Professional life?

Ans:

There is not much market value in writing simple if then else Programs. You will be valued higher for your ability to model and simplifying complex Problems. Solving any Problem involves trade-offs and making choice among competing alternatives this is what operation research is.

(1) You have mobility across industries and across:

You can apply your core.

O.R. skills to almost any industry

So you're far more recession-proof than if focused on one cyclical industry. And with O.R. training, you can move into management consulting, operation marketing, finance, or a number of other fields.

(2) You don't have to subscribe to a dominant worldview.

O.R has no single mode of Professional Practice, so you never have to get bored or pigeonholed into a specific technique or problem-solving approach that never change

(3) You become a better Strategist:

The O.R discipline looking at Problem ~~are~~ creating models, and setting up analysis that points to better options and results - helps you make better personal and professional decision, as the national best-seller, Smart Choices by John S Hammond demonstrates.

(4) You're extremely relevant today:

many organization find themselves awash in data with little understanding of how to leverage that data for better results with O.R for her

You bring "the Science of Better tools and approaches for having

insight from data to make dramatic improvement through ~~the~~ the organization.