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ID# :- 14798
Subject :- Operations Research (OS)
Class Timing :- WED \Rightarrow 8:00 to 14:00

Q5: Write a detailed note on how this course (OS) will help you in your professional life?

Ans: Operation Research (OS) help us in our professional life in the following reasons.

- Solve Real-world problems

With the help of (OS) we can solve some Real-world problem. The problems matter to organizations & have an impact. In areas such as health care, public policy, resources management, and disaster relief. you can truly change

people's lives for the better

- Analytical Skills & Creativity

(OS) provide us a job in an industry such as healthcare, manufacturing, finance, government or military, these are the jobs.

- Mobility across industries & Careers:

We can apply our core O.R skills to almost any industry - pharmaceuticals, law enforcement, even entertainment so you/we are far more recession-proof than if focused on one cyclical industry. And with O.R training, we can also move into management, consulting, operations, marketing, finance, or a number of other fields.

- Subscribe to a dominant worldview:

O.R has no single mode of professional

practice, so we/you can never have to get bored or pigeonholed into a specific technique or problem-solving approach that never changes.

provide a Better Strategist

The discipline of O.R has no single looking at problems, creating models and setting up analysis that points to better options & results - helps we/you make better personal & professional decisions.

Make a great living

The O.R professional starting salary average is \$60,000 to \$70,000 and it's easy to move up to \$100,000.

Fun at work

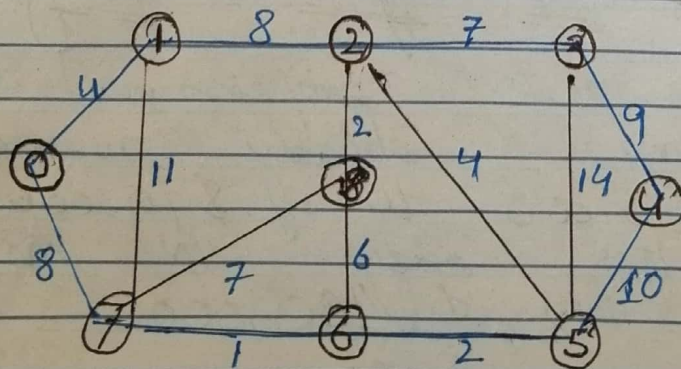
In They have ability and OR to have an impact on millions (even hundreds)

of millions) of dollars means that companies put its solutions to use, and when we/you have been part of a solutions, it's a great feeling.

————— X —————

Q4

(Ans)

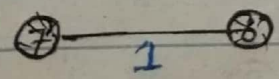


So, this graph contains 9 vertices and 14 edges. So, the minimum spanning tree formed will be having $(9-1) = 8$ edges.

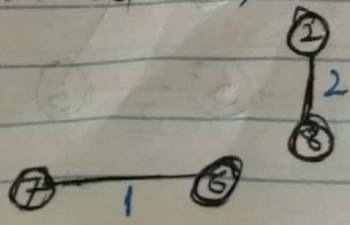
After sorting		Src	Dest
Weight			
1	1	7	6
2	2	8	2
3	2	6	5
4	4	0	1
5	4	2	5
6	6	8	6
7	7	2	3
8	7	7	8
9	8	0	7
10	8	1	2
11	9	3	4
	10	5	4
	11	1	7

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

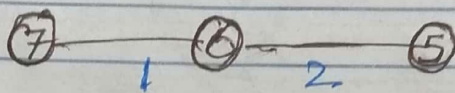
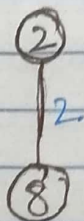
1. pick edge 7-6 no cycle is formed. include it



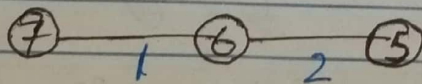
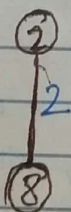
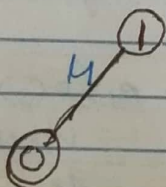
2. pick edge 8-2 no cycle is formed, include it



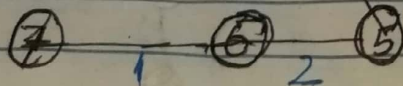
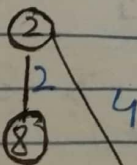
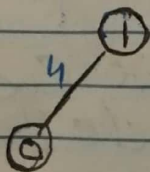
3. pick edge 6-5 No cycle is formed, include it



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

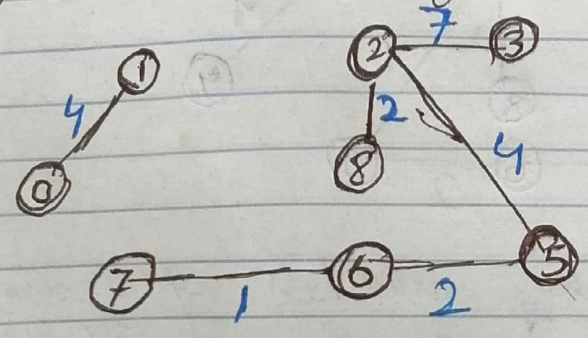


5. pick edge 2-5 No cycle is formed, include it



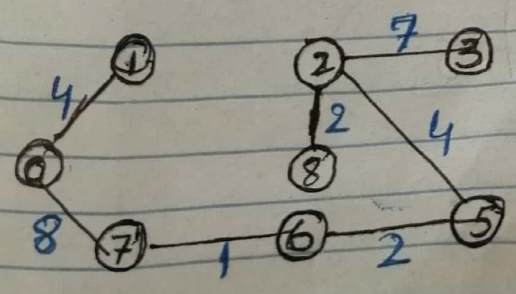
6. pick edge 8-6 since including this edge results in cycle, discard it.

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



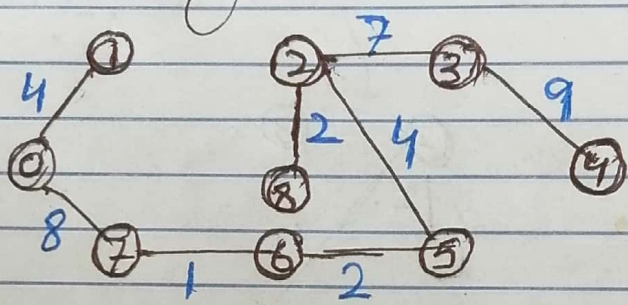
8. pick edge 7-8 since including this edge results in cycle, (discard it).

9. pick edge 0-7 No cycle is formed, include it.

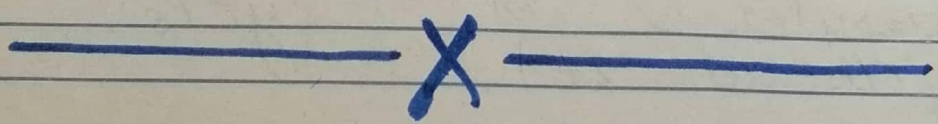


10. pick edge 1-2 since include
in this cycle results
in cycle discard it

11. pick edge 3-4 No cycle
is formed, include it



Since the number of edges
include equals $(V-1)$
the algorithm stops here.

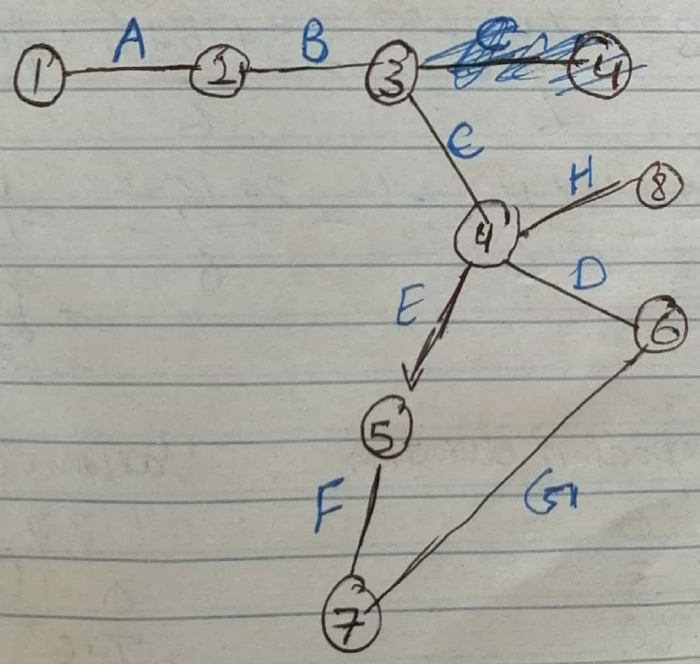


Q2

(Ans)

Activity	Predecessor	O	M	P
A	-	4	5	12
B	A	2	3	4
C	B	6	8	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

(a) Construct the project network.



(b) Expected duration E
Variance σ^2

Formula

$$t_e = \frac{t_o + 4t_m + t_p}{6}$$

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

$$te_2 = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = \boxed{3}$$

$$te_3 = \frac{6 + 4(8) + 22}{6} = \frac{6 + 32 + 22}{6} = \boxed{10}$$

$$te_4 = \frac{4 + 4(5) + 8}{6} = \frac{4 + 20 + 8}{6} = \boxed{6}$$

$$te_5 = \frac{8 + 4(4) + 5}{6} = \frac{8 + 16 + 5}{6} = \boxed{4}$$

$$te_6 = \frac{2 + 4(4) + 6}{6} = \frac{2 + 16 + 6}{6} = \boxed{4}$$

$$= \boxed{3}$$

$$= \boxed{18}$$

Mean expected deviation

Variance

6
3
10
6
4
4
3
81.77
0.11
7.09
0.44
0.11
0.44
0.11
2.78

Variance $(\sigma^2 = (\frac{tp - to}{6})^2$

$$\sigma_1^2 = \left(\frac{12 - 4}{6}\right)^2 = \left(\frac{8}{6}\right)^2 = \boxed{1.77}$$

$$\sigma_2^2 = \left(\frac{4 - 2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = \boxed{0.11}$$

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

$$\sigma_4^2 = \left(\frac{8 - 4}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = \boxed{0.44}$$

$$\sigma_5^2 = \left(\frac{5 - 3}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = \boxed{0.11}$$

$$\sigma_6^2 = \left(\frac{6 - 2}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = \boxed{0.44}$$

$$\sigma_7^2 = \left(\frac{4 - 2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = \boxed{0.11}$$

$$\sigma_8^2 = \left(\frac{18 - 8}{6}\right)^2 = \left(\frac{10}{6}\right)^2 = \boxed{2.76}$$

C. Find the critical path & expected completion time

Critical path

