

ID:- 14531

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Subject:- Operation Research

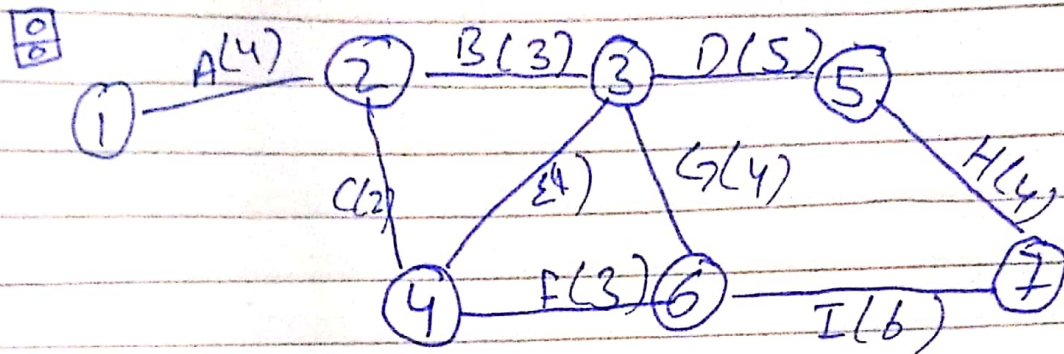
Semester:- BS(S.E)-4

Section:- A

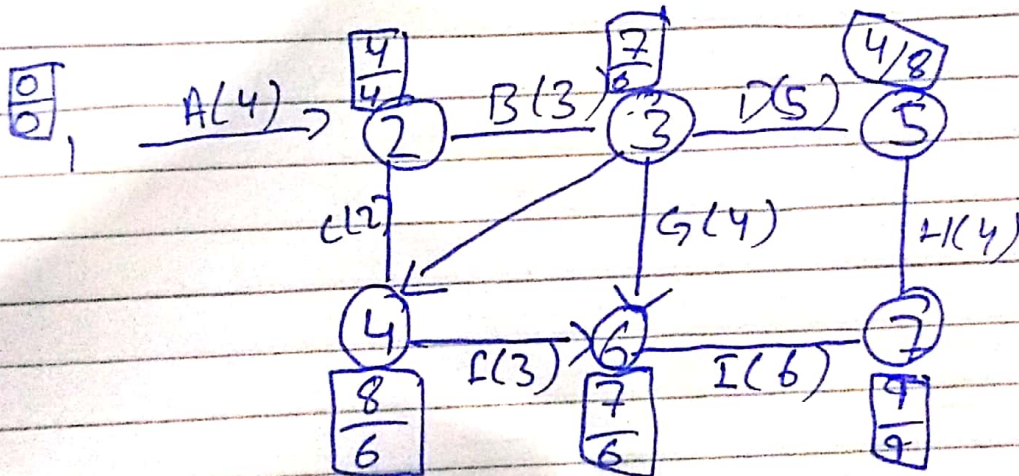
Date:- 23/06/20.

Question N.01(a):-

Answer:-



Question N.01(b):-



We know that

$$ES_j = \text{Max}(ES_i + D_{ij})$$

$$\text{For Node 1} = ES_1 = 0$$

$$\text{Node 2} = 0 + 4 = 4$$

$$\text{" " 3} = 4 + 3 = 7$$

$$\text{" " 4} = 3 + 1 = 4$$

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

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

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

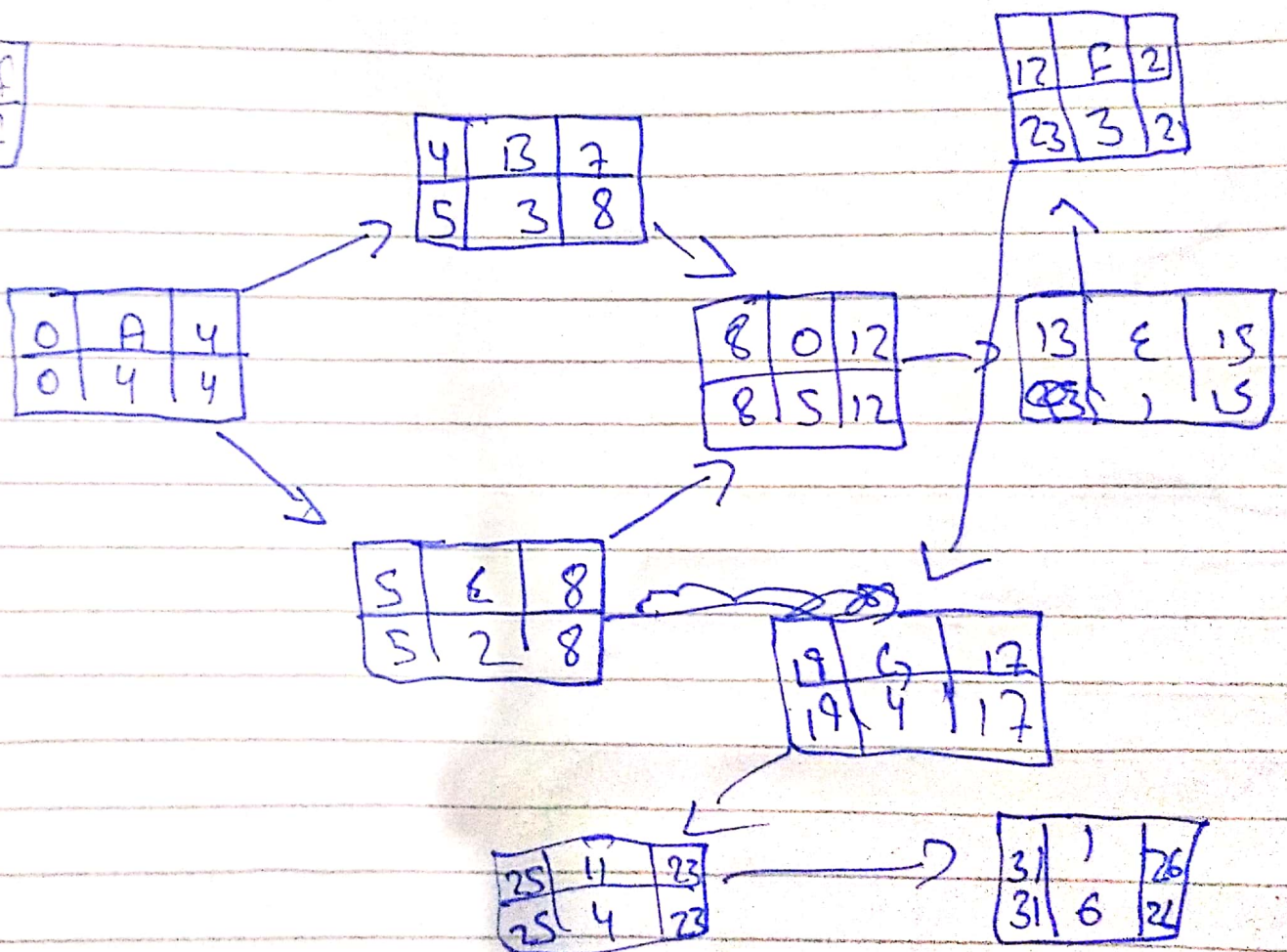
Question N.01 (c):-

Total float = TF

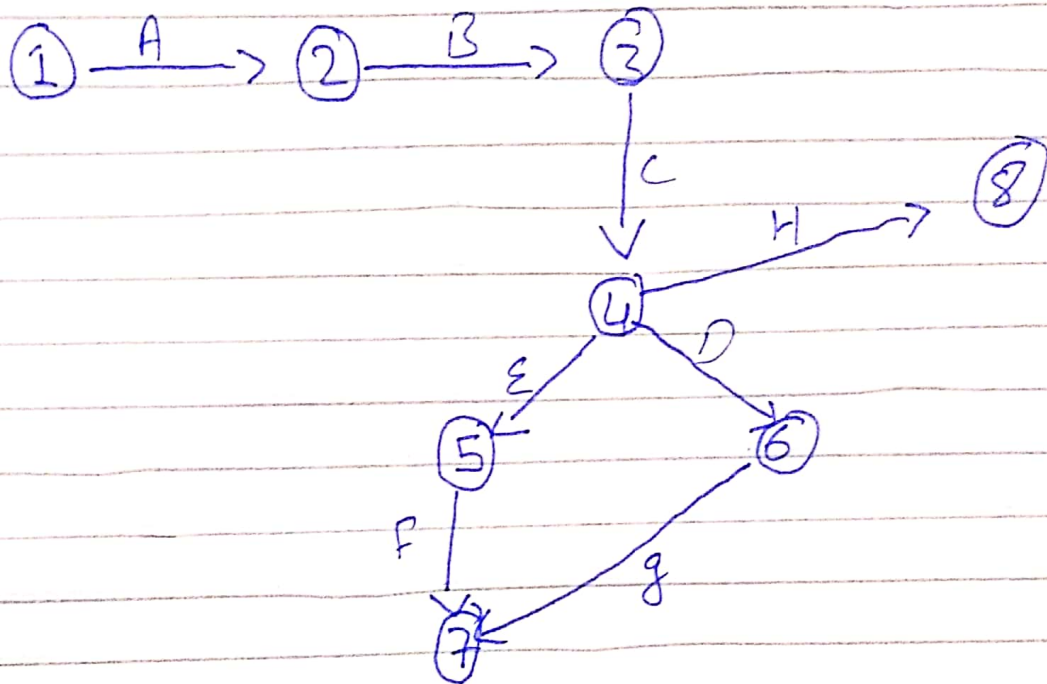
$$TF = LF - EF$$

$$TF = LS - ES$$

ES	Act	EF
LF	dur	LF



Question N.O(2-a):



Question N.O 2(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.

$$(\text{mean}) t_e = \frac{t_o + 4t_m + t_p}{6}$$

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

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

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

$$te_4 = \frac{4 + 4(6) + 8}{6} = \frac{4 + 24 + 8}{6} = 6$$

$$te_5 = \frac{3 + 4(4) + 5}{6} = \frac{3 + 16 + 5}{6} = 4$$

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

$$te_7 = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = 3$$

$$te_8 = \frac{5 + 4(7) + 15}{6} = \frac{5 + 28 + 15}{6} = 8$$

Variance (σ^2) :-

by formula.

$$\sigma^2 = \left(\frac{\sum p - t_0}{6} \right)^2$$

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

$$= (1.33)^2$$

$$= 1.77$$

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

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

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

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

$$= 0.11$$

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

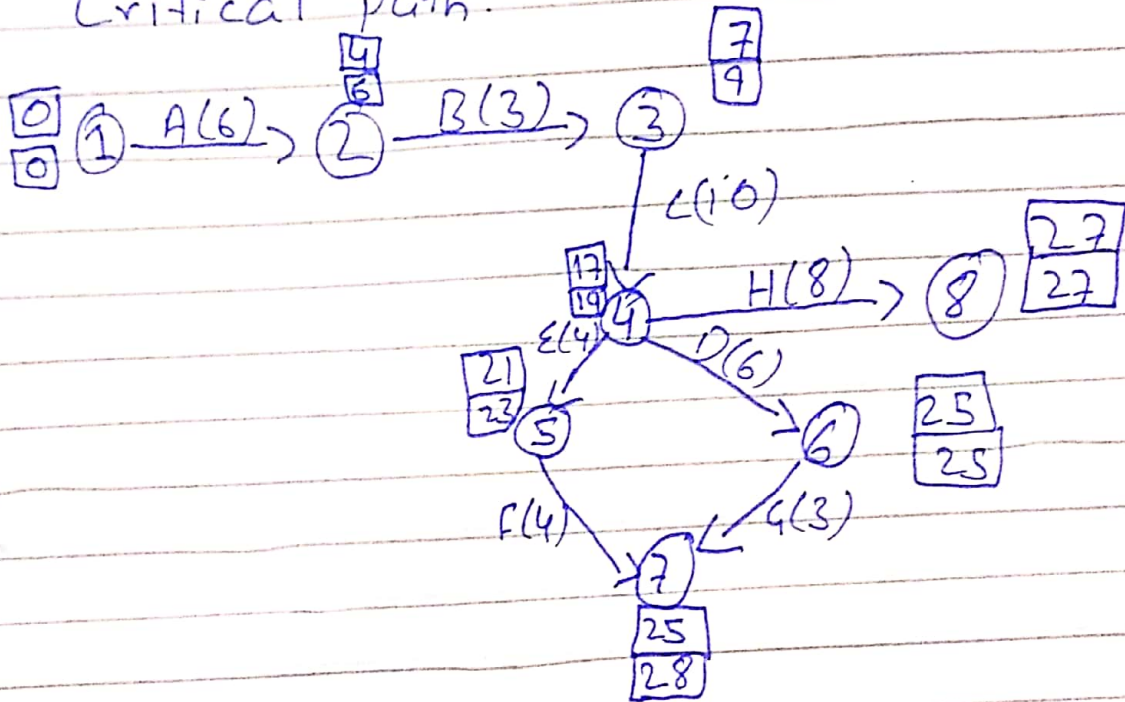
$$= 0.44$$

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

$$\sigma_8^2 = \left(\frac{15 - 5}{6} \right)^2 = \left(\frac{10}{6} \right)^2 = 2.76$$

Question N.O 2(c):-

Critical path.



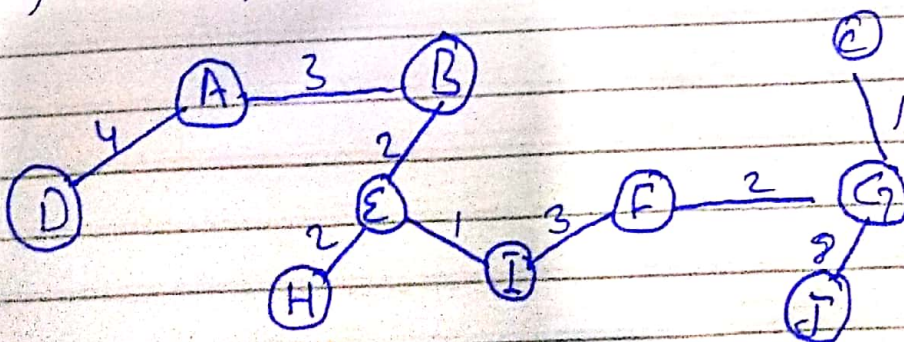
Question N.O(3):-

Answer:-

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

Steps

- i) Choose an arbitrary start vertex
- ii) keep including connected.

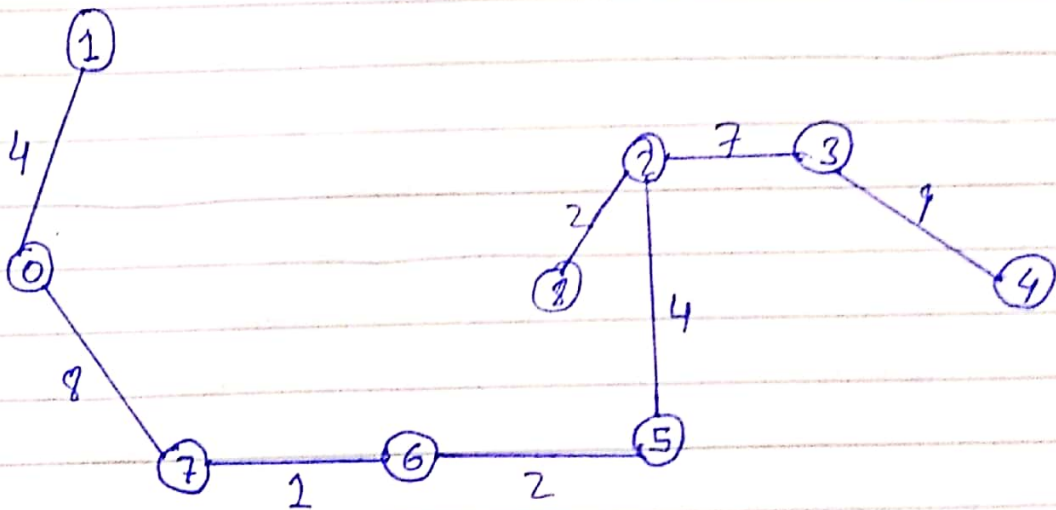


Question (4):-

Answer:-

In this type of Algorithm we have to pick the smallest weight without creating a cycle.

The minimum spanning tree will have $(n-1)$ edges thus $9-1=8$ edges.



Question N.o(5):-

Answer:-

Operation research is an analytical method of problem solving and decision making that is useful in the management of organisation. In operation research problems are broken down into basic components and then solved in defined steps by mathematical analysis.

Importance OF Operation Research:-

The field of operation research provides a more powerful approach to decision

making than ordinary software and data analytic tool

Uses Of Operation Research In Professional Life:-

- i) You don't have to subscribe to a dominant worldview ~~and~~ 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 changes
- ii) You become a better strategist. The OR discipline looking at problems, creating models and setting up analysis that points to better options and results helps you make better personal and professional decisions.
- iii) You're extremely relevant today. Many organisations find themselves awash in data with little understanding of how to leverage the data for better results. With O.R. you bring the "Science of Better" tools and approaches for harvesting insight from data to make dramatic improvement throughout the organisation.
- iv) You can ~~have~~ make a great living. The average starting salary for an OR professional is \$60,000 to \$70,000 and its easy to move upto \$100,000 per anum. ~~to~~

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.

THE END