

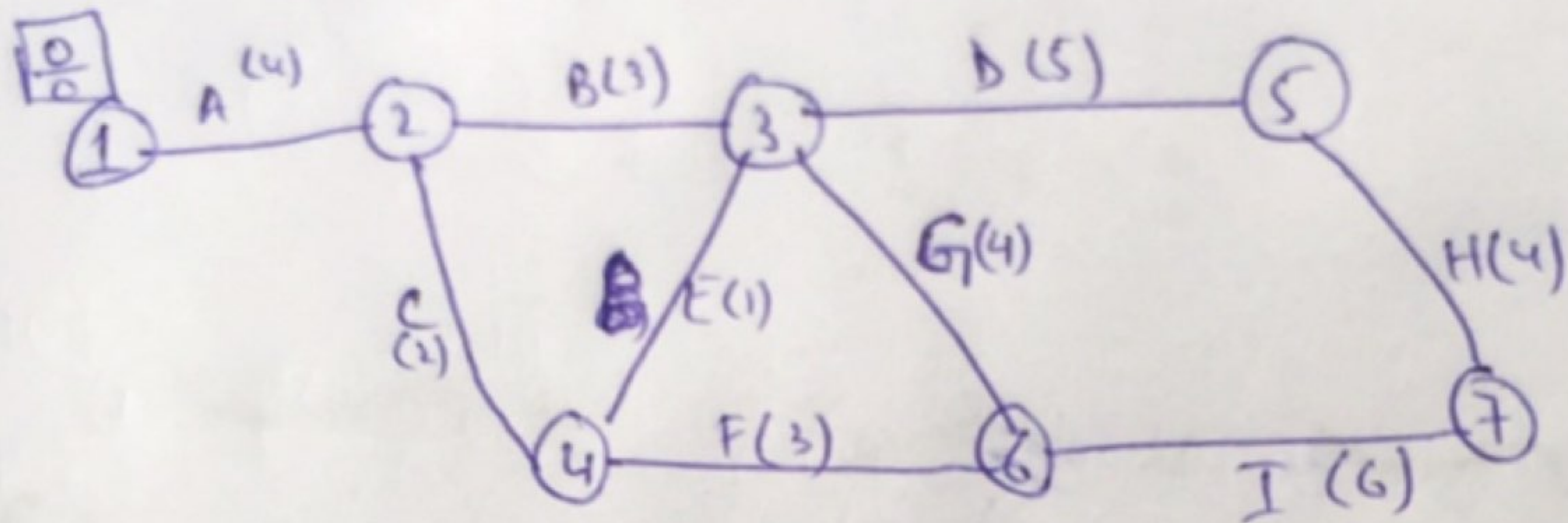
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ID NO :: 15038.

Semester :- 4th Section :- A

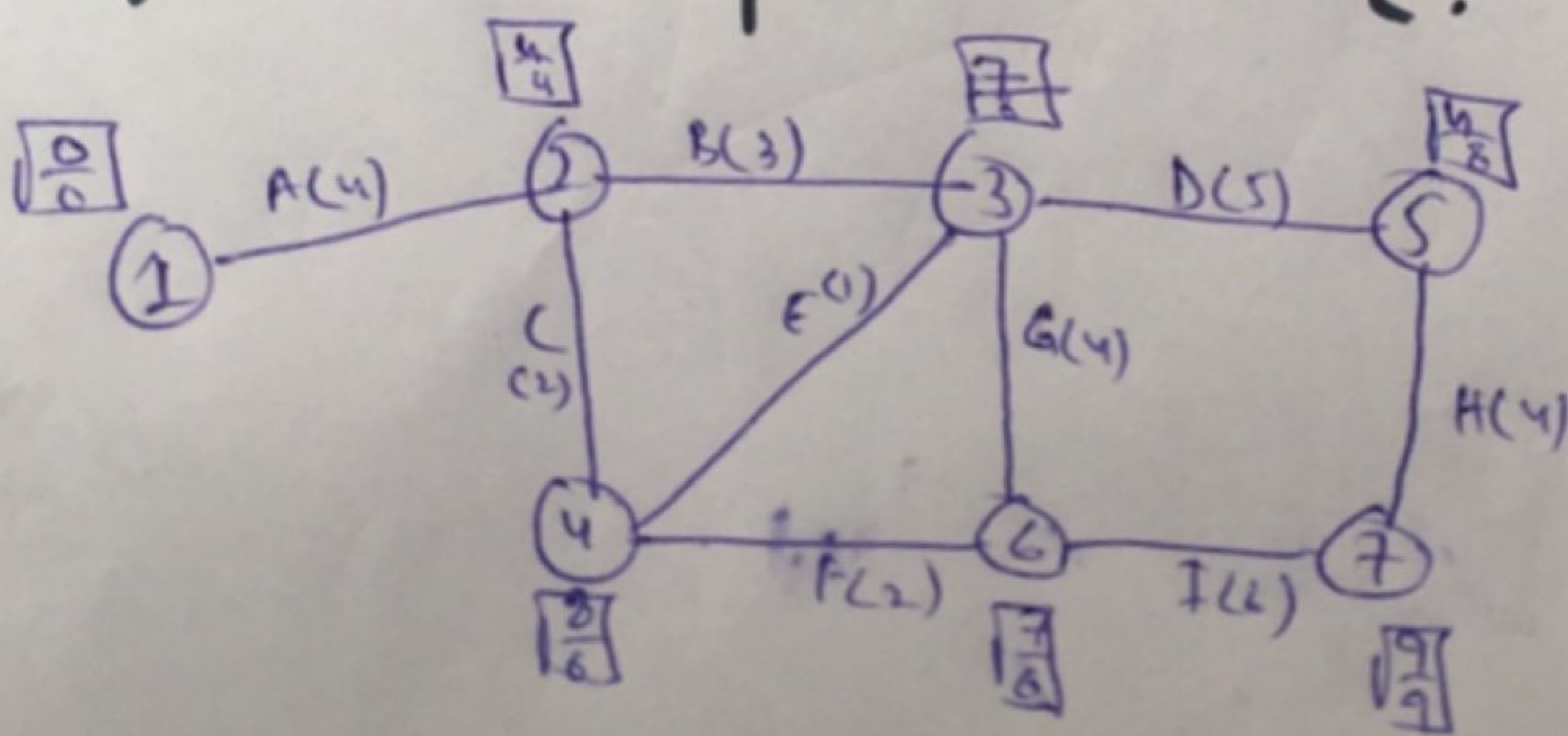
Q NO 1

a) Calculate the CPM Network.



1

b) Determine the critical path and project completion time.



We know that

$$E_{ij} = \max(E_{si} + D_{ij})$$

For node 1 = $E_{s1} = 0$

Node 2 = $0 + 4 = 4$

Node 3 = $4 + 3 = 7$

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Node 4 = 3+1=4

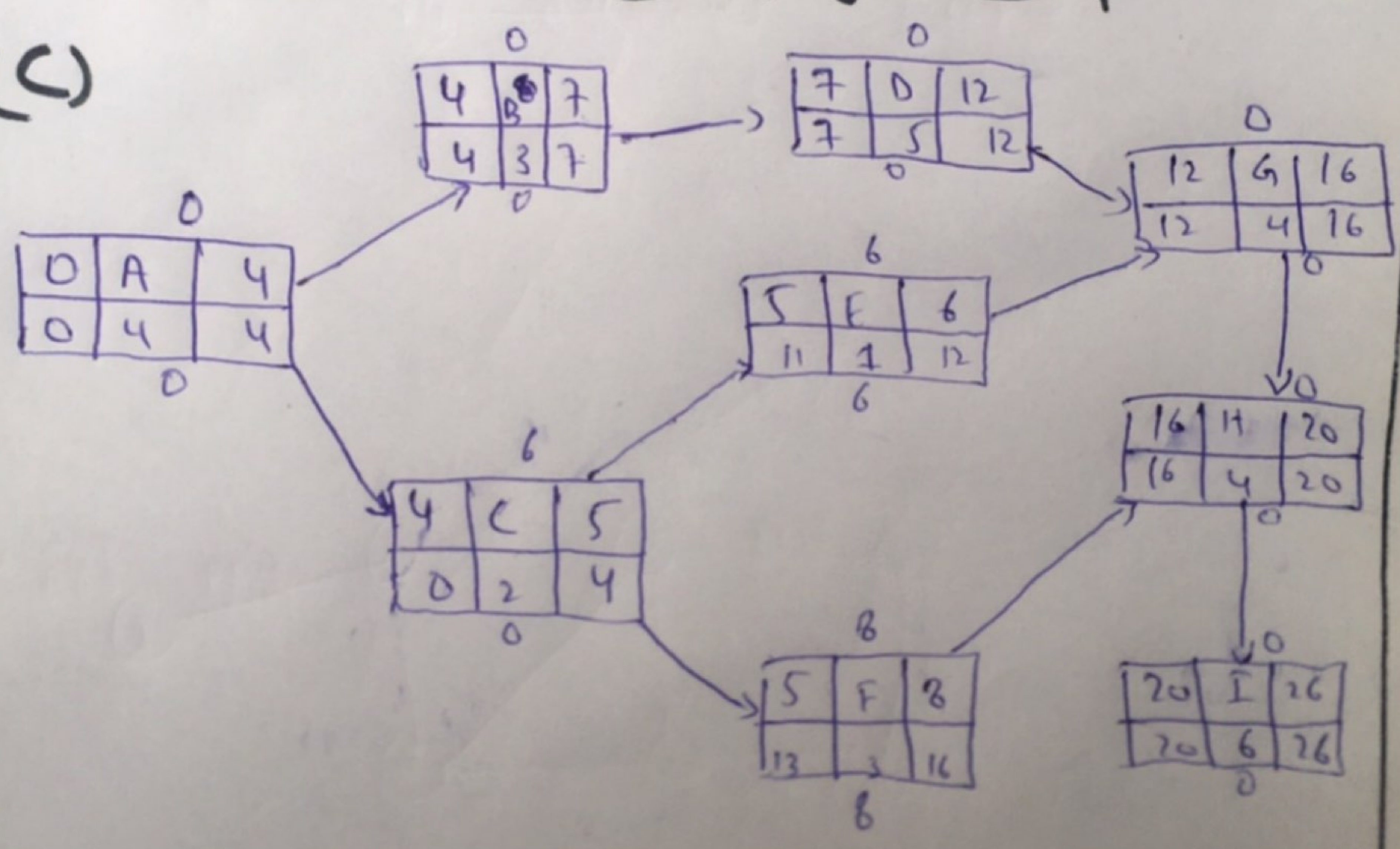
Node 5 = 3+5=8

Node 6 = 3+4=7

Node 7 = 5+4=9

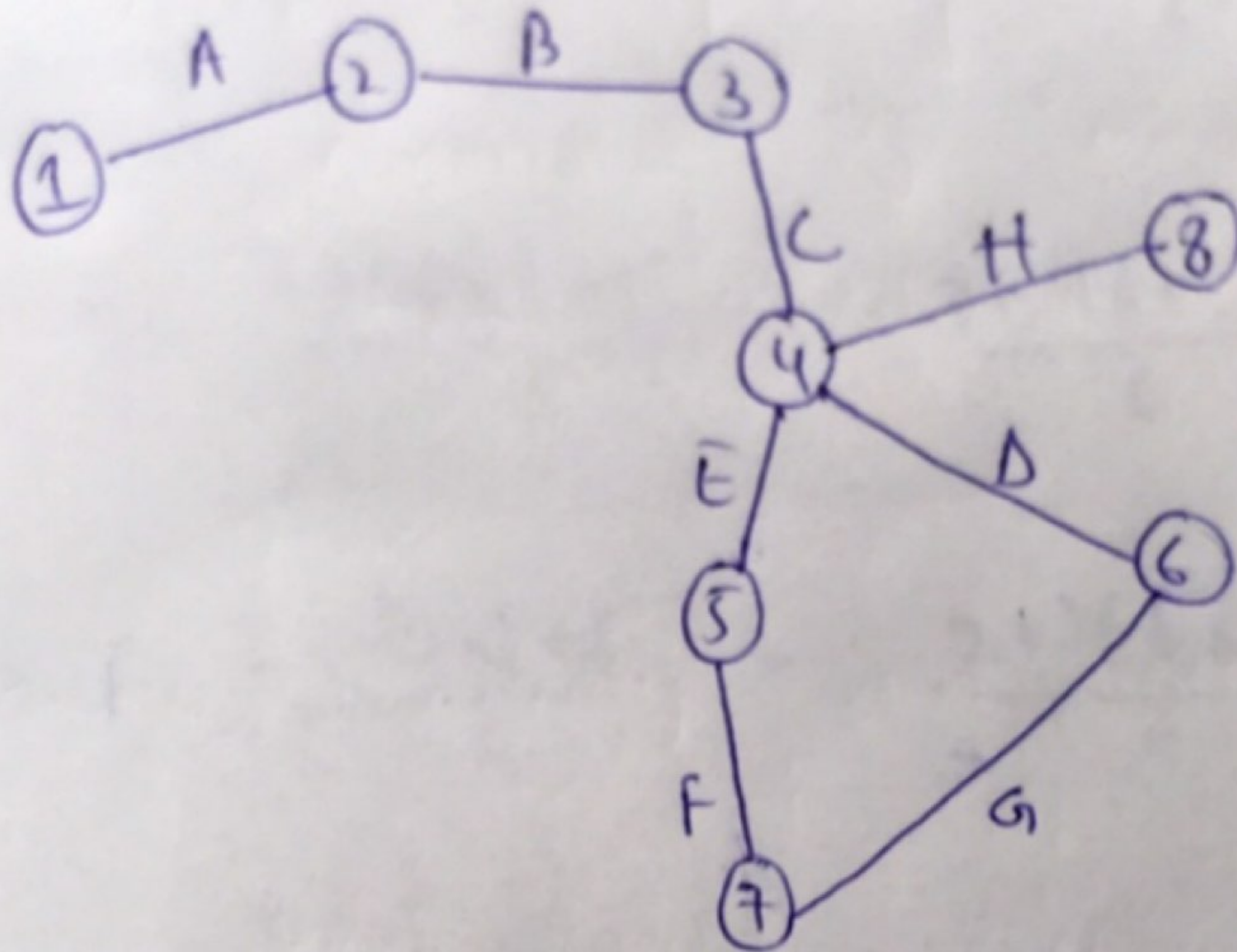
(2)

(C)



Q# 2

a) Construct the project network?



3

b) Formula

$$(Mean) \quad t_{e_i} = \frac{t_o + 4t_m + t_p}{6}$$

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

$$= 6$$

$$t_{e_2} = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = 3$$

of convert to budget expenses

Q#5

$$tc_3 = \frac{6 + 4(8) + 22}{6} = \frac{6 + 32 + 22}{6} = 10$$

$$tc_4 = \frac{4 + 4(6) + 8}{6} = \frac{4 + 24 + 8}{6} = 6$$

$$tc_5 = \frac{3 + 4(4) + 15}{6} = \frac{3 + 16 + 15}{6} = 4 \quad (4)$$

$$tc_6 = \frac{2 + 4(4) + 6}{6} = \frac{2 + 16 + 6}{6} = 4$$

$$tc_7 = \frac{2 + 4(3) + 4}{6} = \frac{2 + 12 + 4}{6} = 3$$

$$tc_8 = \frac{5 + 4(7) + 15}{6} = \frac{5 + 28 + 15}{6} = 8$$

Variance:

Formula

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

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

$$(1.33)^2 = 1.77$$

$$b_2^2 = \left(\frac{4-2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

$$b_3^2 = \left(\frac{22-6}{6}\right)^2 = \left(\frac{16}{6}\right)^2 = 7.09$$

$$b_4^2 = \left(\frac{8-4}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = 0.44$$

(5)

$$b_5^2 = \left(\frac{5-3}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

$$b_6^2 = \left(\frac{6-2}{6}\right)^2 = \left(\frac{4}{6}\right)^2 = 0.44$$

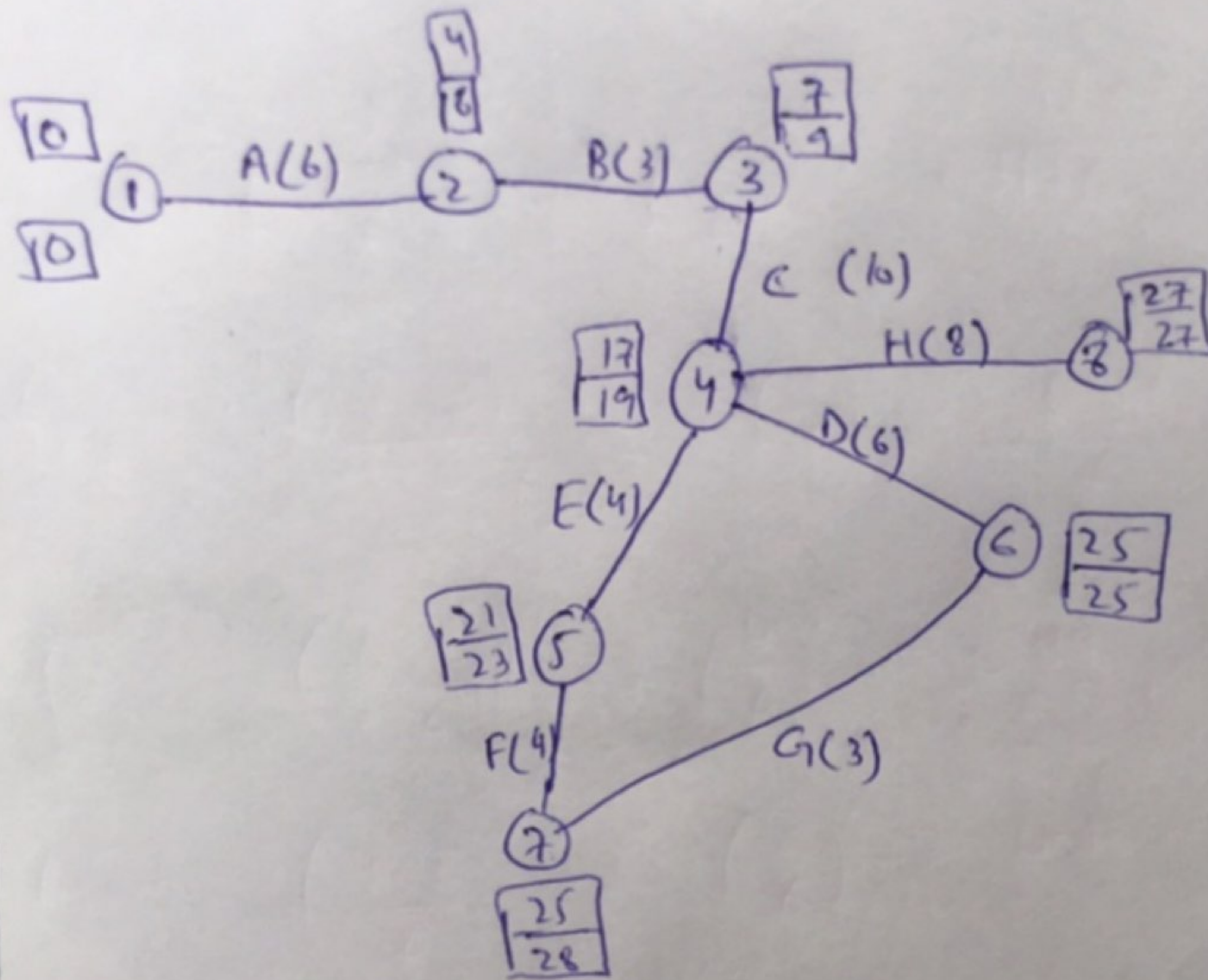
$$b_7^2 = \left(\frac{4-2}{6}\right)^2 = \left(\frac{2}{6}\right)^2 = 0.11$$

$$b_8^2 = \left(\frac{15-5}{6}\right)^2 = \left(\frac{10}{6}\right)^2 = 2.76$$

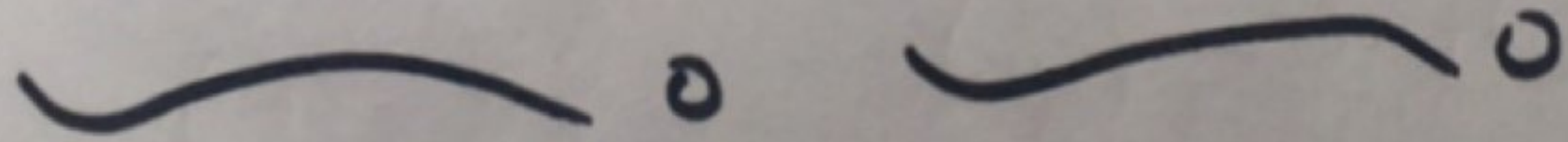
~~~~~ 0                      ~~~~~ 0

c) Find the critical path and expected project completion time.

Critical path..



6



Or write a detailed note on how this course...  
... in your professional life.

Ans Following are the reasons to consider a career in operation research.

1) You have the opportunity to solve real world problems.

These problems matter to organizations and have an impact in areas such as health care, public policy, resource management and disaster relief, you can truly change people's life for the better. 7

2) You don't have to subscribe to a dominant world view.

OR has no single mode of professional practice so you never have to get bored or pigeonholed in to a specific technique or problem solving approach that never changes.



3) You become a better strategist:

The OR discipline looking at problems, creating models and setting up analysis that points to better option and results helps you make better personal and professional decisions; as the national best seller smart choices. (8)

4) 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, manufacturing, finance, government or military there is a job in OR for you.

5) You make a great living: The average starting salary for an OR professional is \$ 60,000 to \$ 70,000 and its

easy to move up to \$100,000 in  
finance you can make up to \$300,000  
or more -

6) You're not part of a fad:- The diverse  
techniques of OR including mathematical  
programming, simulation decision analysis (9)  
are all proven with hundreds of  
successful case studies. At the same  
time each application area is  
evolving so you constantly have the  
same opportunity to learn new things.

7) You can have fun at work:- In many  
professional careers, little of what  
you create is implemented. The ability  
of OR to have an impact save  
millions of dollars means that  
companies put its solution to use.  
That when you have been part of  
solution, it's a great feeling.

b) 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 or you bring the "science of better" tools and approaches for harvesting insight from data to make dramatic improvements through out the organization.

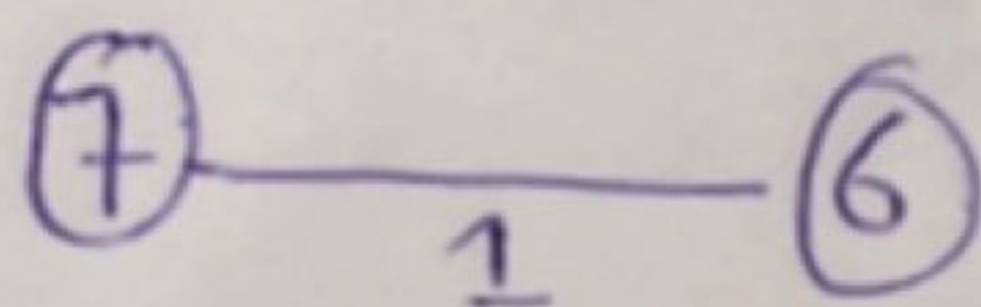


Q4 For the following graph, find the minimum spanning tree using Kruskal's algorithm?

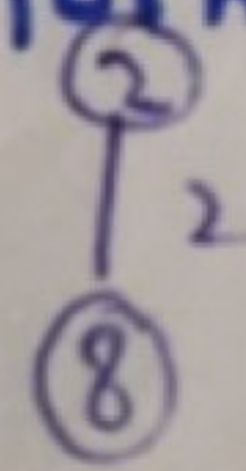
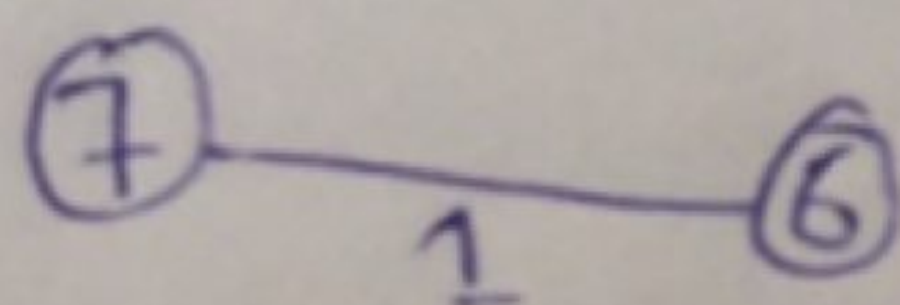
The graph contains 9 vertices and 14 edges, so the minimum spanning tree formed will be having  $(9-1) = 8$  edges.  $\checkmark$

Now picking up the edges one by one.

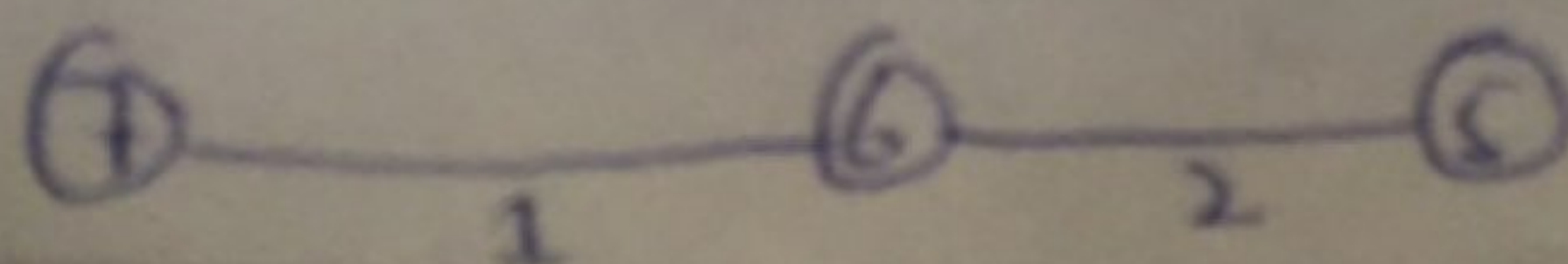
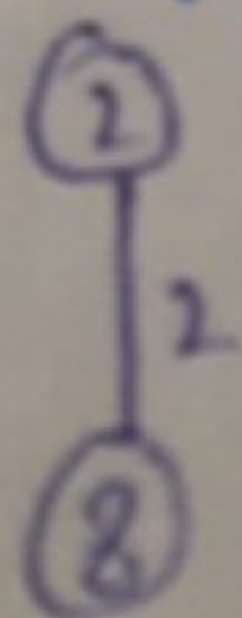
1) Pick edge 7-6: No cycle is formed, include it.



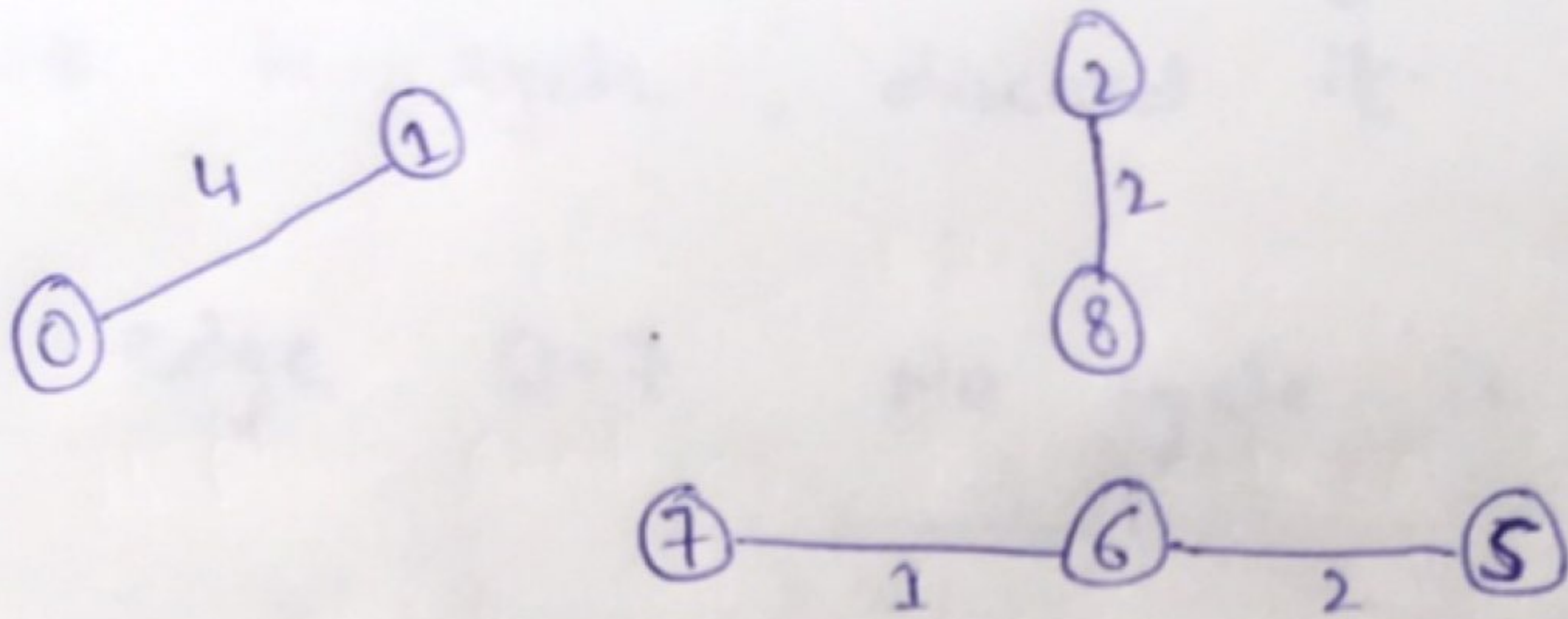
2) Pick edge 8-2: No cycle is formed.



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

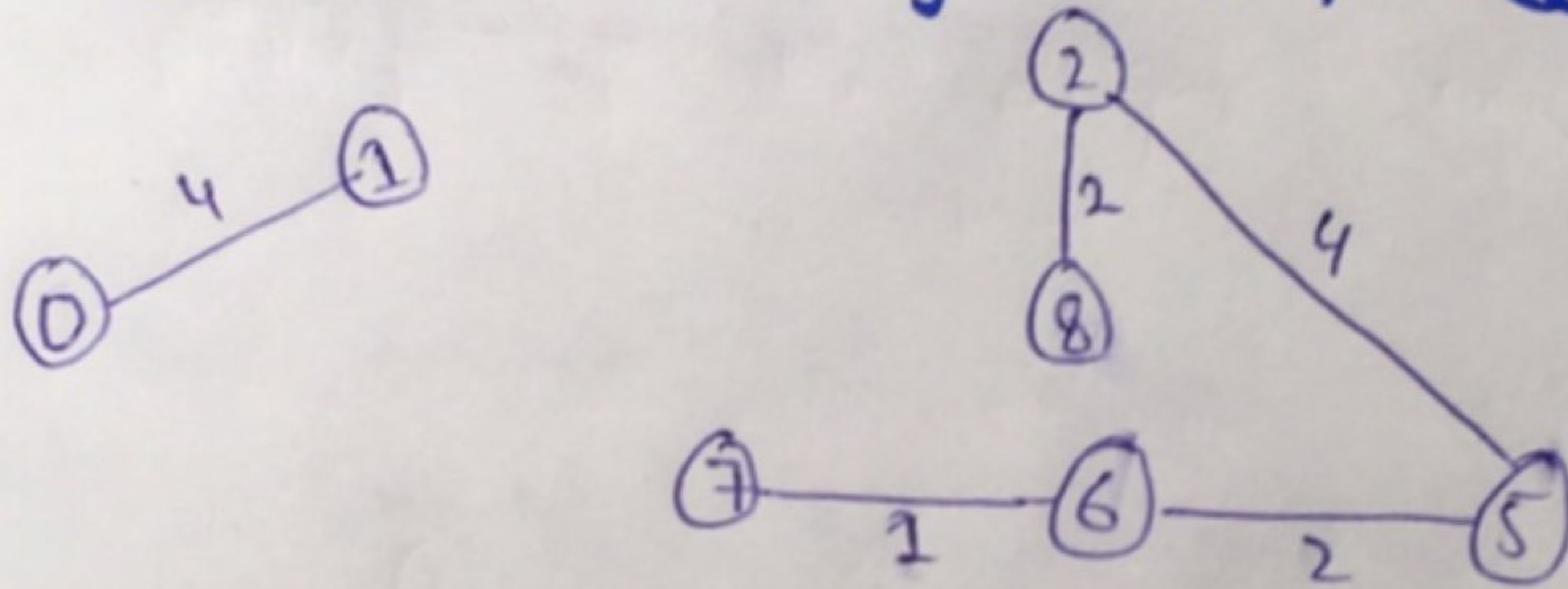


4) Pick edge 0-1 No cycle is formed.

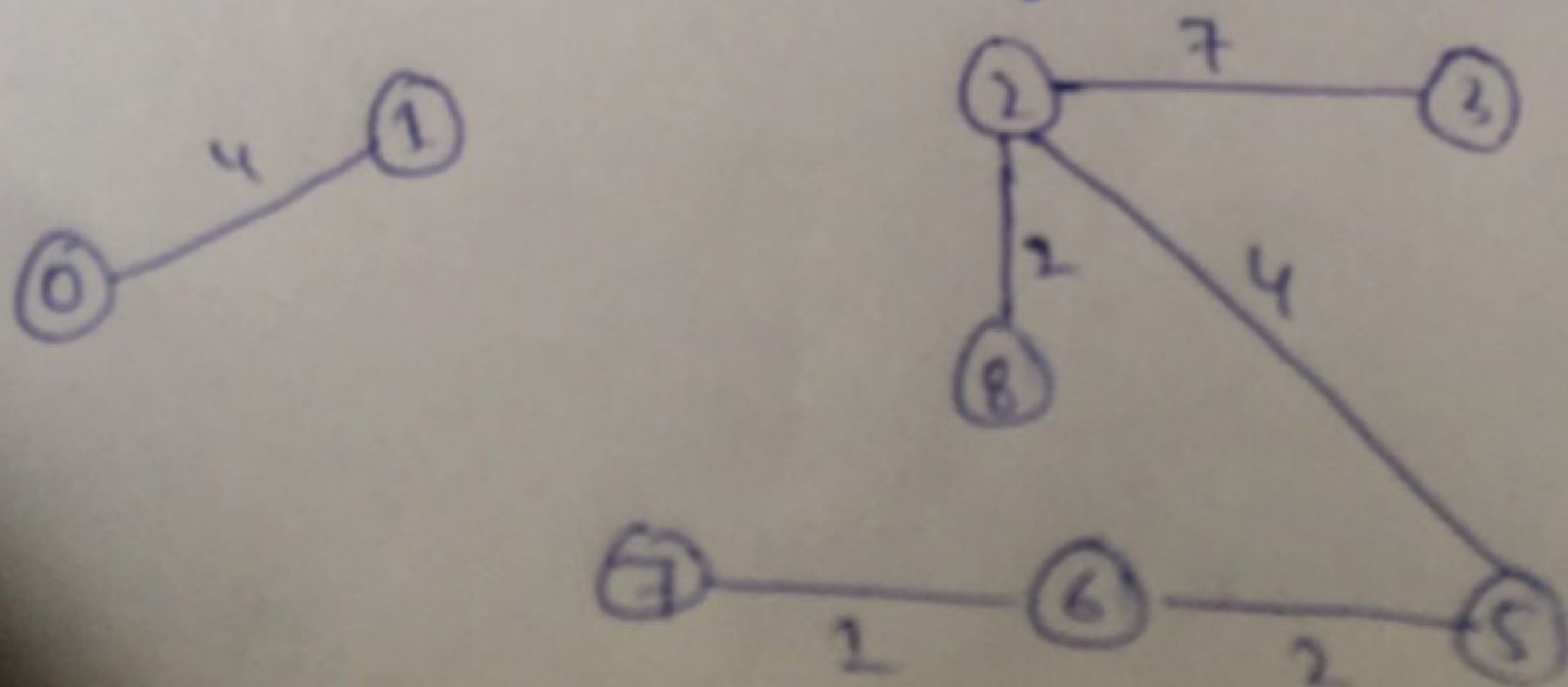


5) Pick edge 2-5 No cycle is formed

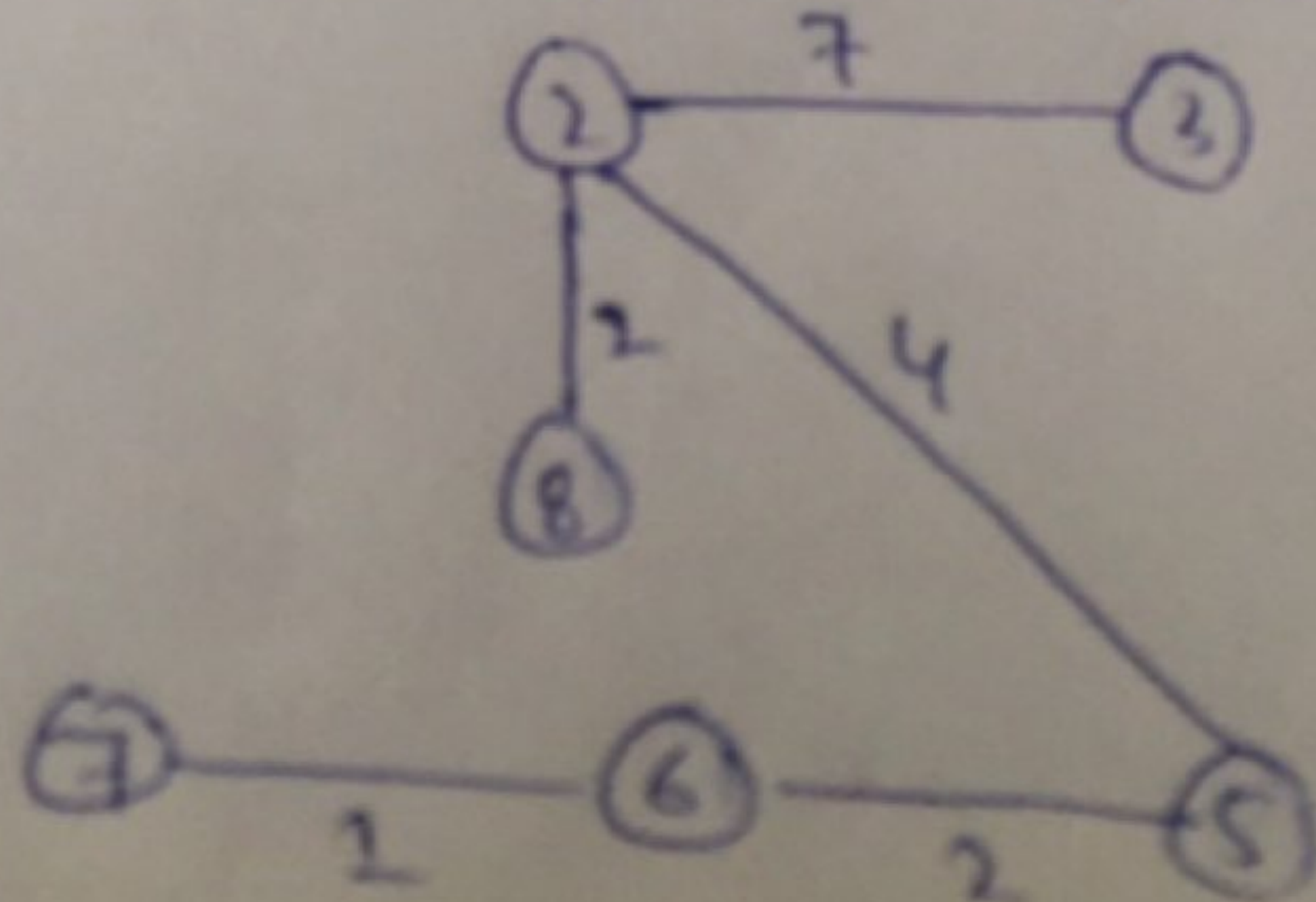
12



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

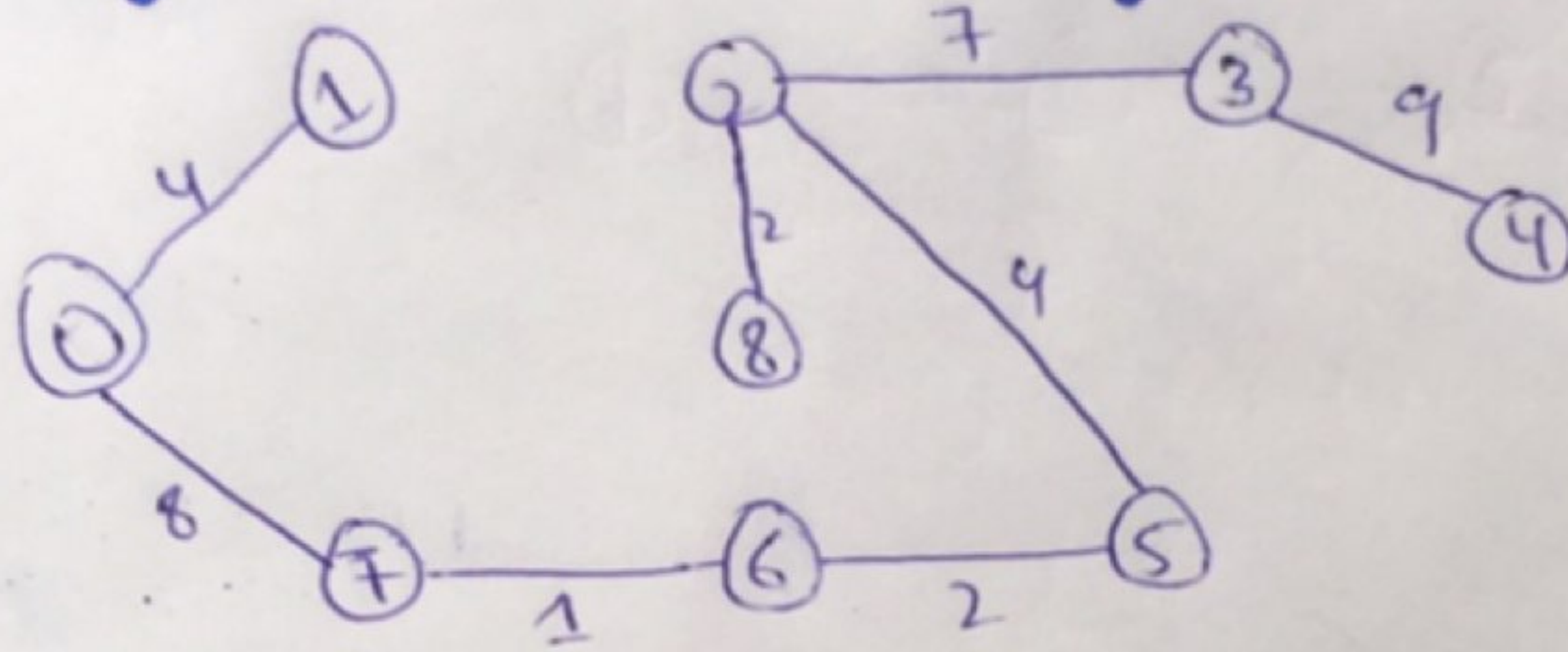


7) Pick edge 2-3: No cycle is formed



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

c) Pick edge 0-7 No cycle is formed



13

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



Q. No 3

In Ans prims algorithm the idea is simple to create a spanning tree with all sides connected by minimum weight also there should be no cycles.

Step # 1

choose arbitrary start vertex.

14

Step 2:- keep including connected edges.

