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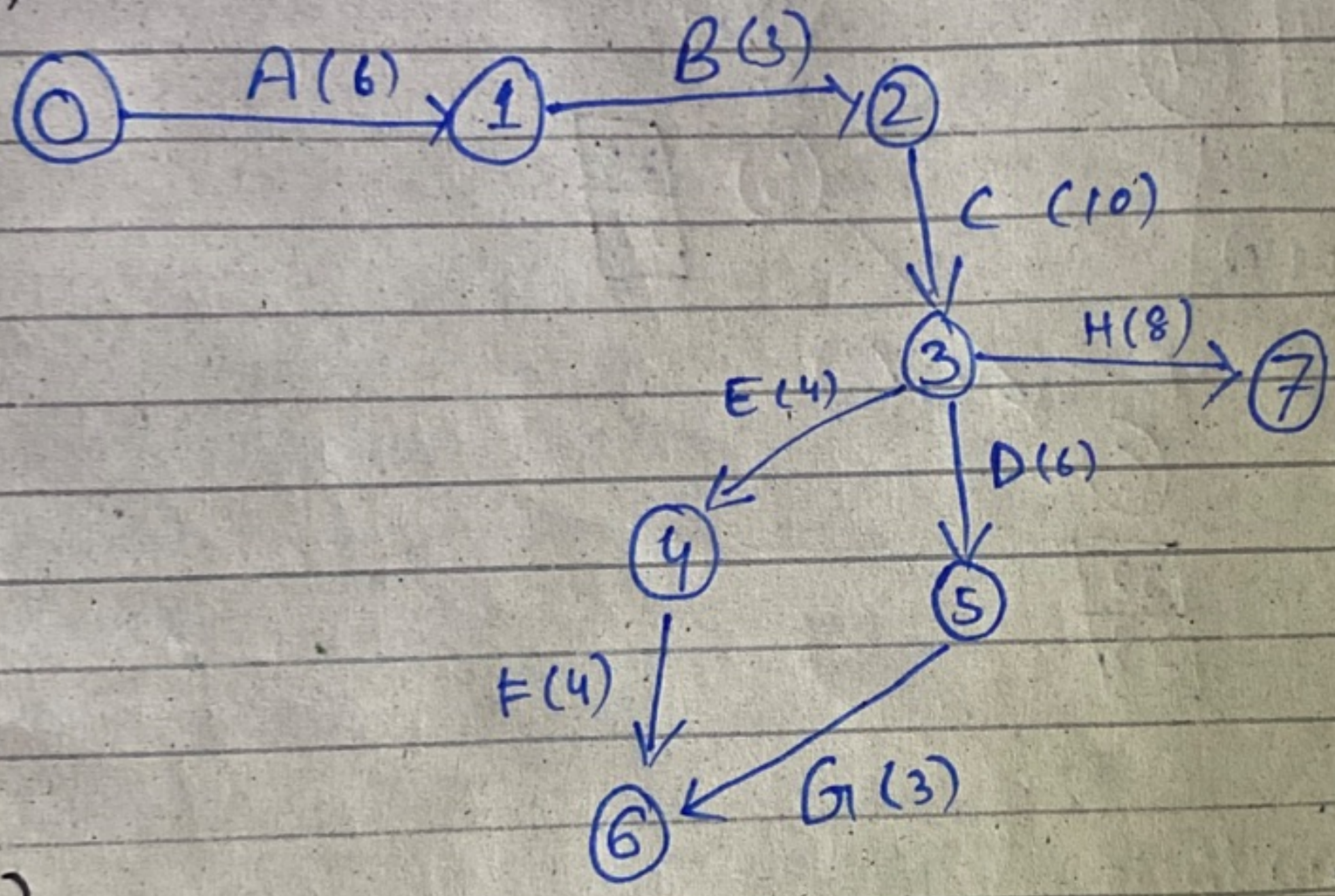
Q2:-

(a) Project network:-



(b)

Act.	To	Tm	Tp	Mean	Variance
A	4	5	12	$\frac{4+4(5)+12}{6} = 6$	$(\frac{12-4}{6})^2 = 1.77$
B	2	3	4	$\frac{2+3(4)+4}{6} = 3$	$(\frac{4-2}{6})^2 = 0.11$
C	6	8	22	$\frac{6+4(8)+22}{6} = 10$	$(\frac{22-6}{6})^2 = 7.11$
D	4	6	8	$\frac{4+6(4)+8}{6} = 6$	$(\frac{8-4}{6})^2 = 0.44$
E	3	4	5	$\frac{3+4(4)+5}{6} = 4$	$(\frac{5-3}{6})^2 = 0.11$
F	2	4	6	$\frac{2+4(4)+6}{6} = 4$	$(\frac{6-2}{6})^2 = 0.44$
G	2	3	4	$\frac{2+4(3)+4}{6} = 3$	$(\frac{4-2}{6})^2 = 0.11$
H	5	7	15	$\frac{5+4(7)+15}{6} = 8$	$(\frac{15-5}{6})^2 = 2.77$

$$\text{Mean} = \frac{to + 4tm + tp}{6}, \quad \text{Variance} = \left(\frac{tp - to}{6}\right)^2$$

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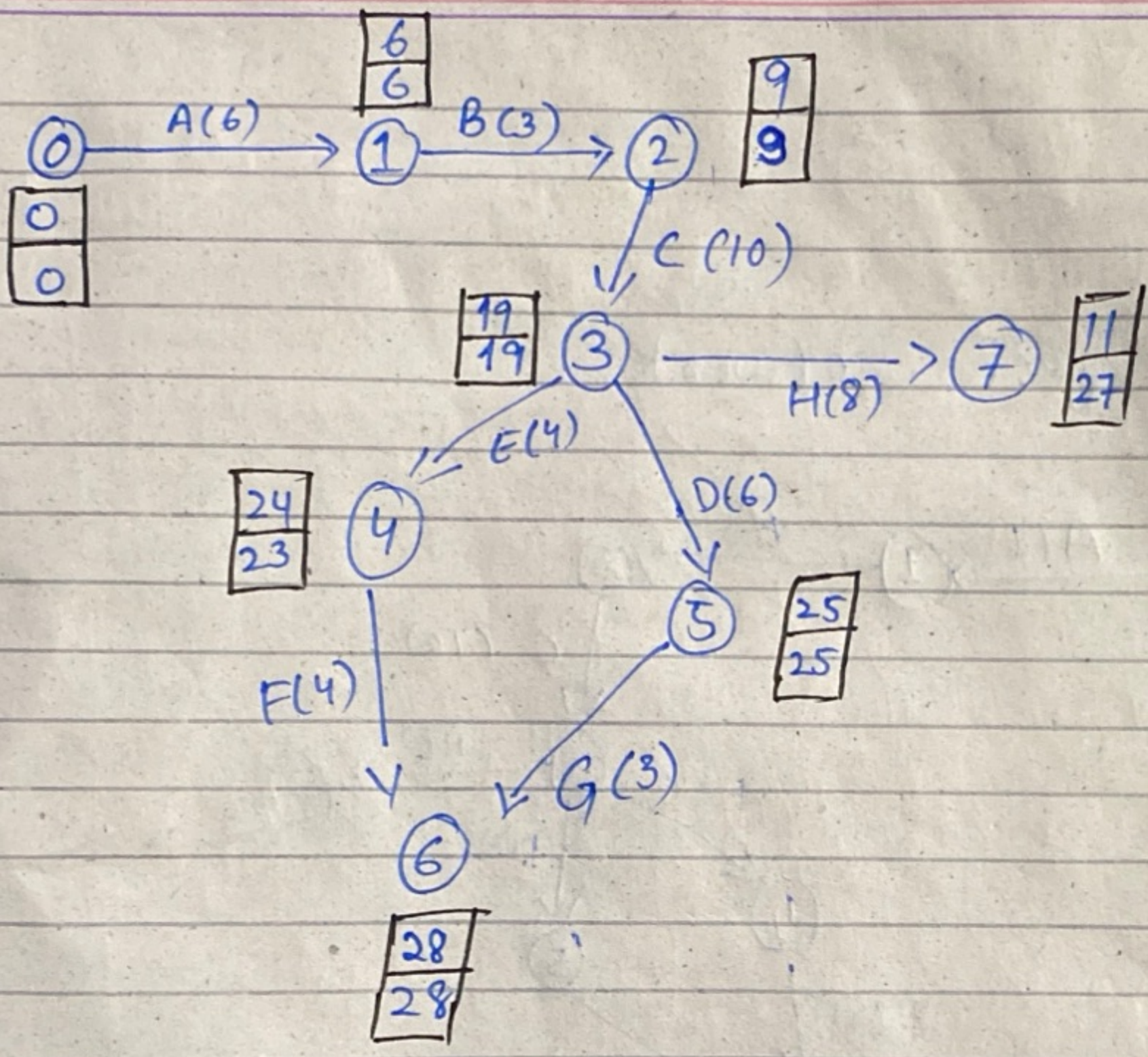
(C)



Critical path :-

1) $A \rightarrow B \rightarrow C \rightarrow E \rightarrow F = 6+3+10+4+4 = 27$

2) $A \rightarrow B \rightarrow C \rightarrow H = 6+3+10+8 = 27$

3) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow G = 6+3+10+6+3 = 2$

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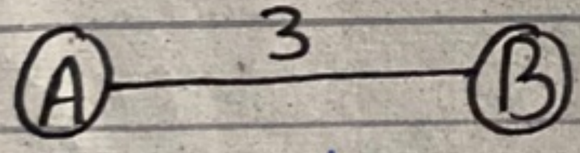
Q3:- For the following graph find min Spanning tree using Prim's algorithm Start with verten A. ---

Step 1:- Remove loops or parallel edges (if any).

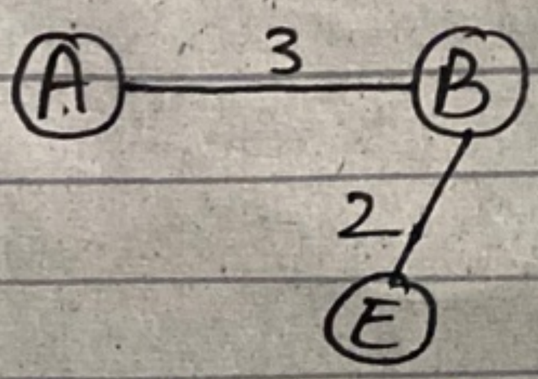
Step 2:- Choosing 'A' node as arbitrary node

Step 3:- Check outgoing edges and select one with less cost.

As root node is A. We have three outgoing edges A-B, A-E and A-D We select A-B as it has less cost.



Now we have node A-3-B. Now we select the edges with the lowest cost which is B-2-E. we get:



Now we have tree A-3-B-2-E. Now adding edges with low cost again

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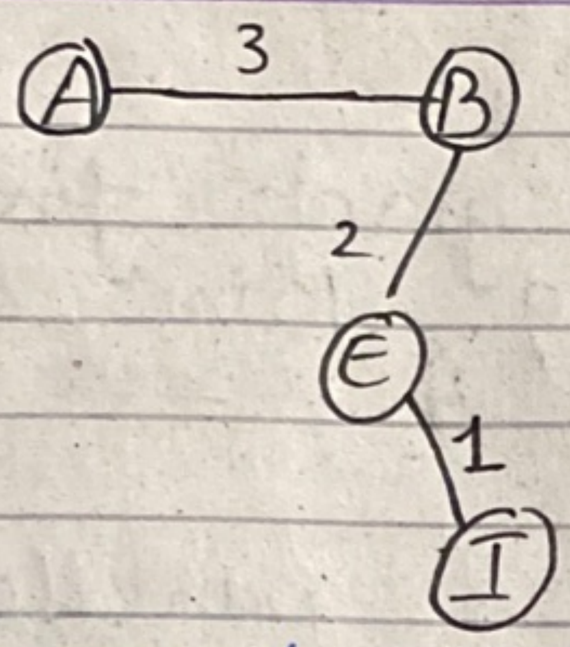
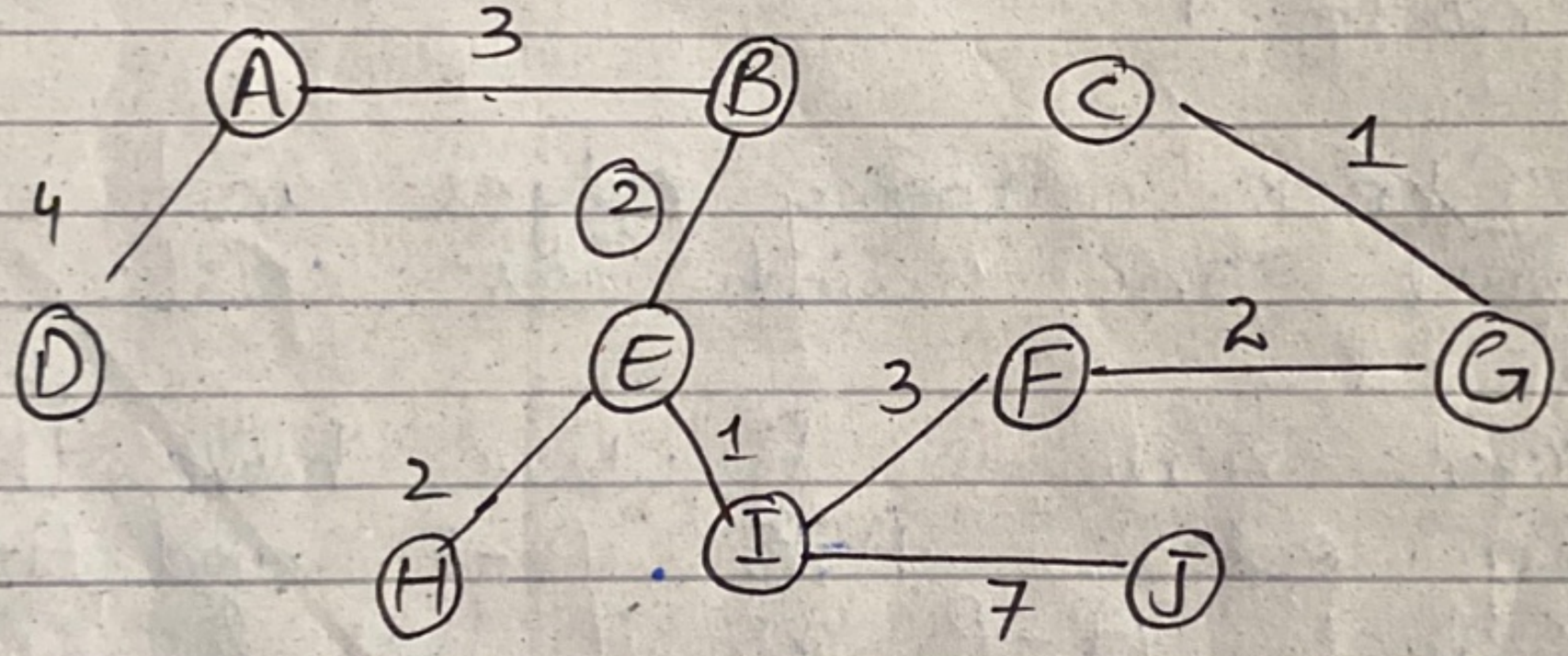


We have tree A-3-B-E-1-I. Now again repeating same procedure. We get a tree



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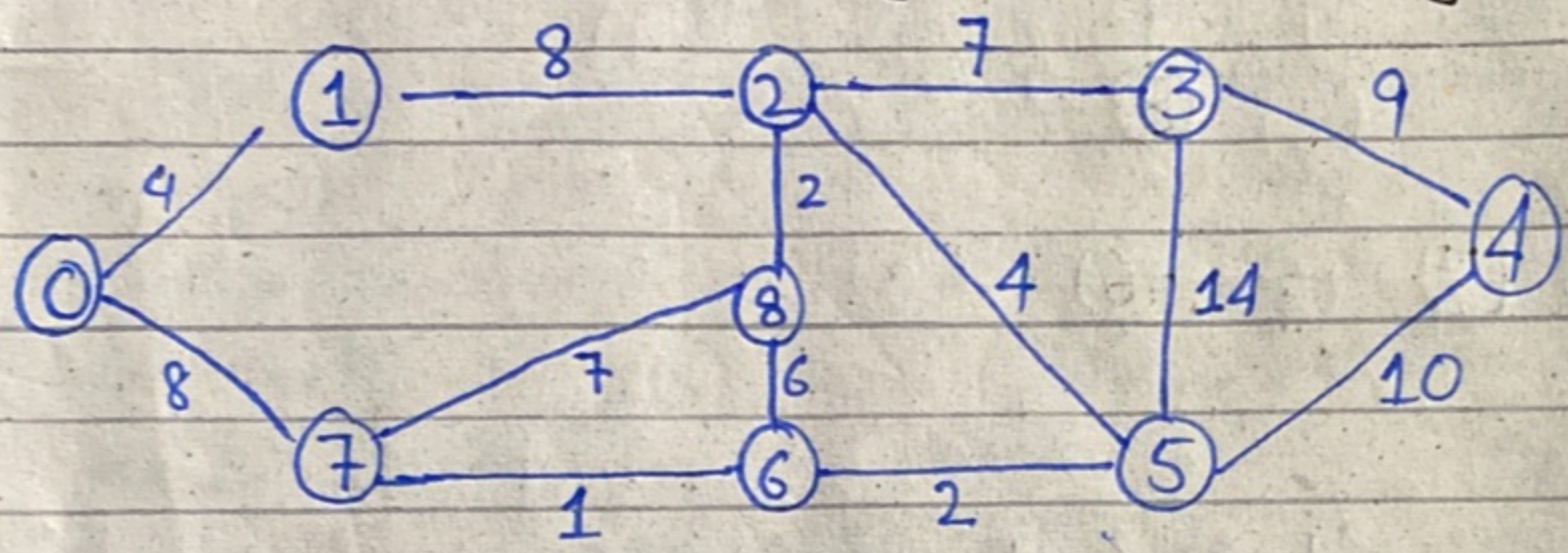
Q4:- For the following graph, find the minimum spanning tree using Kursal's



Step 1:- Remove any loops or parallel edges (if any)

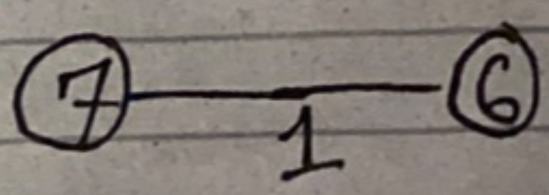
Step 2:- Arrange all edges in their increasing order of weight.

7,6	2,8	6,5	2,5	0,1	8,6	2,3	7,8	0,7	1,2	3,4	5,4
1	2	2	4	4	6	7	7	8	8	9	10

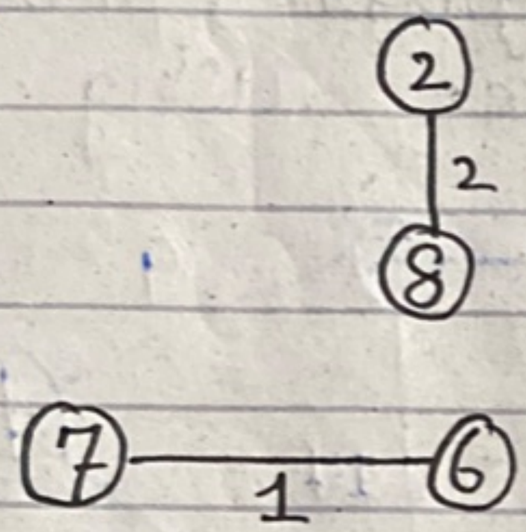
5,3
14

Step 3:- Adding edge which has least weightage

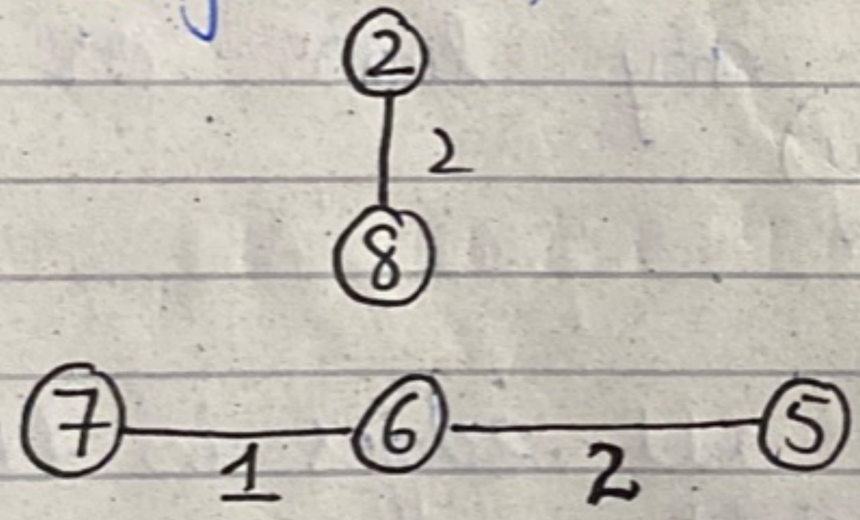
1) Picking edge 7-6, as no cycle is formed



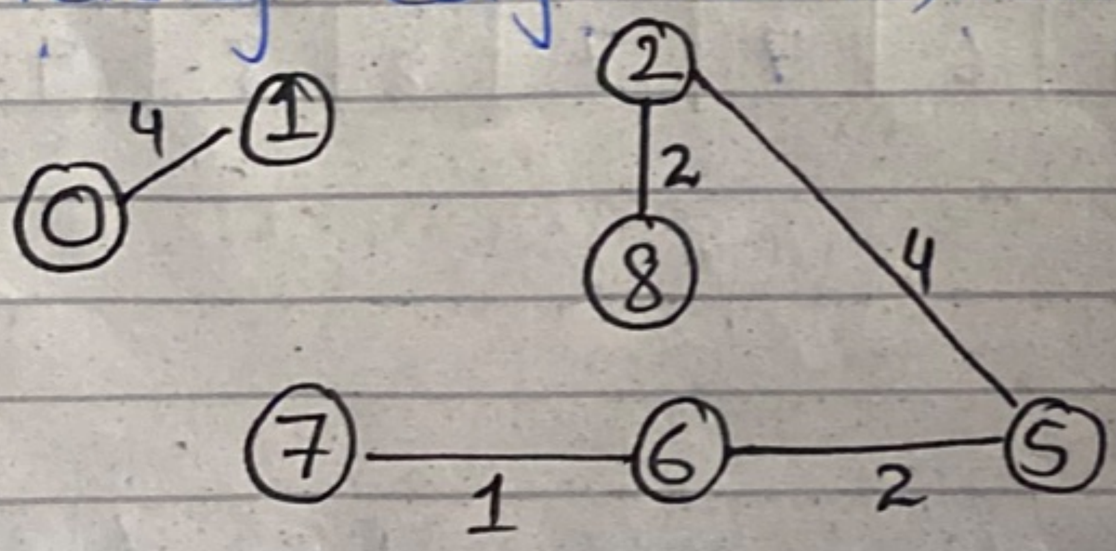
2) Picking edge 2-8, as no cycle is formed



3) Picking edge 6-5, as no cycle is formed

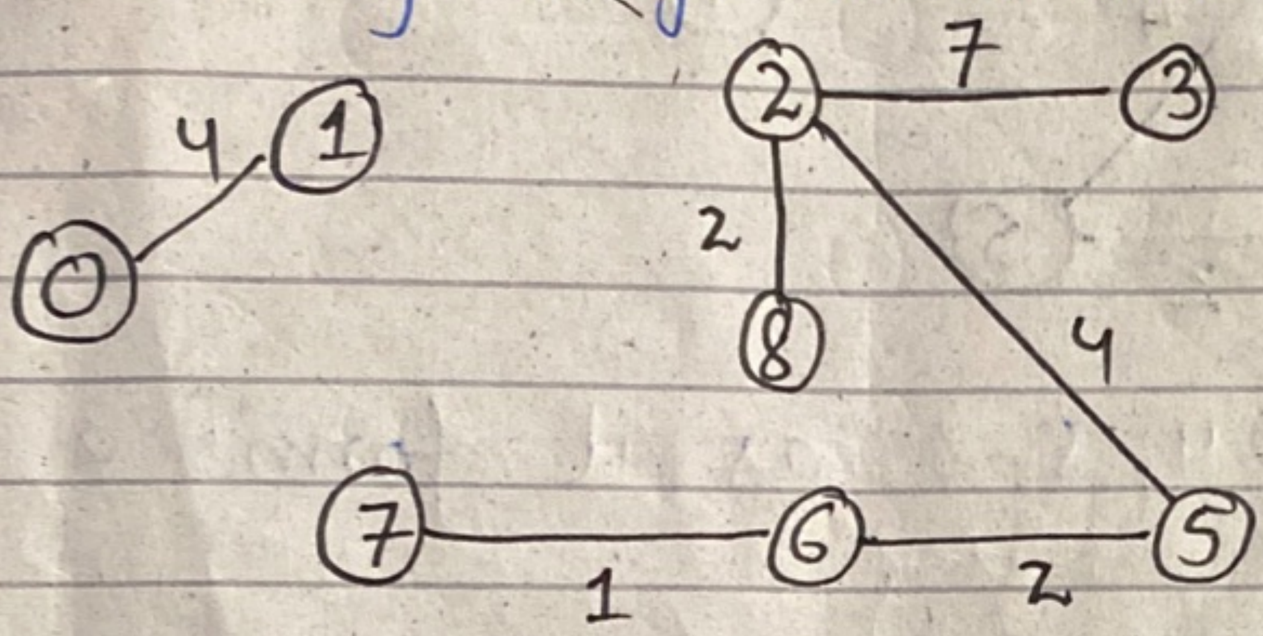


4) Picking edge 0-1, 2-5, as no cycle is formed



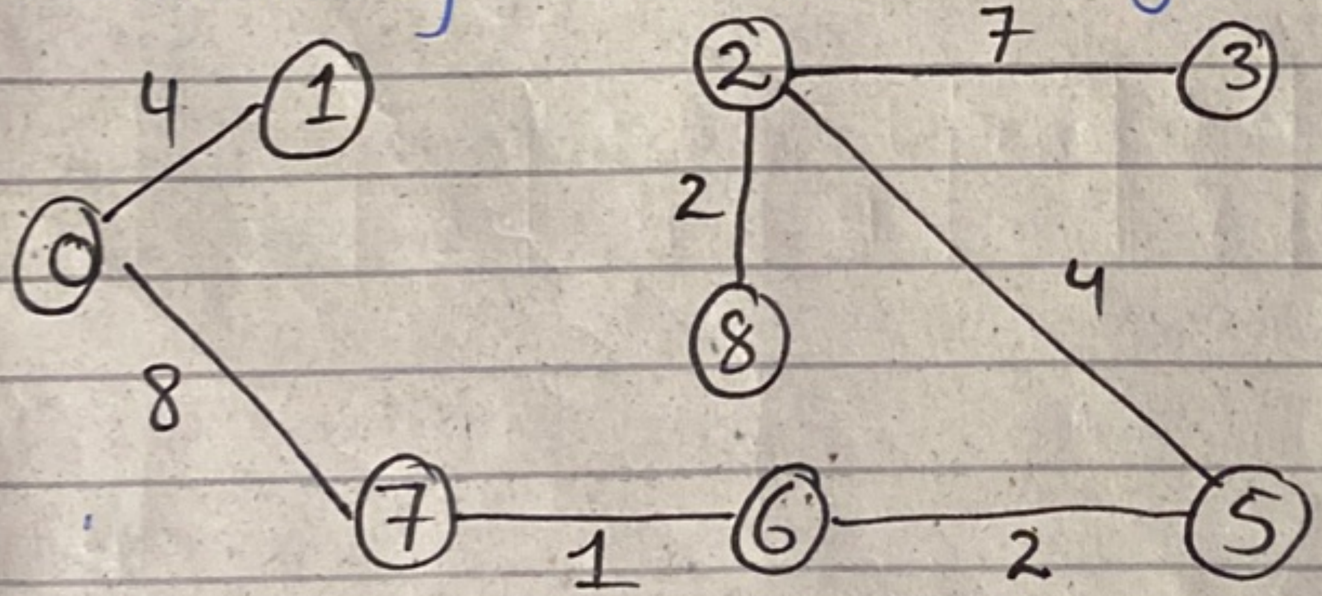
5) Neglecting 8-6, as they create a cycle

6) Picking edge 2-3, no cycle is formed



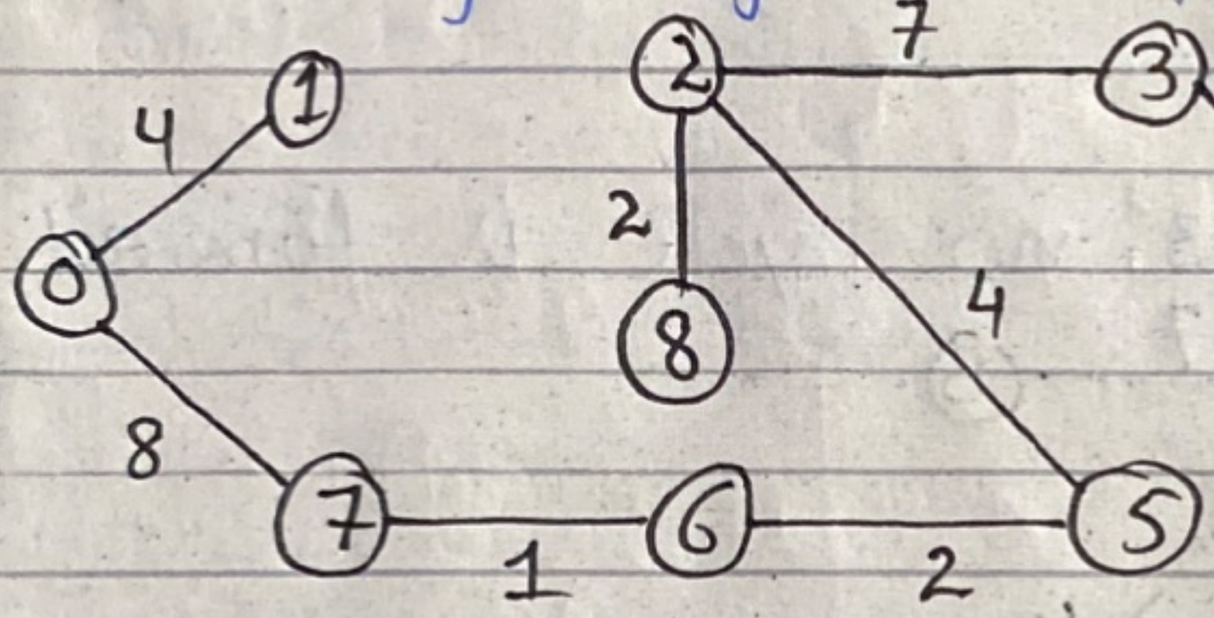
7) Neglecting 7-8, they create a cycle.

8) Picking 0-7, no cycle is created



9) Neglecting 1-2, it creates a cycle.

10) Picking edge 3-4, No cycle is formed



11) Neglecting 5-4, 5-3 as it forms a cycle.

Total weight = 4 + 7 + 9 + 4 + 2 + 1 + 8 + 2
= 37

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Q5)

Ans) As we know that Operation Research is a complete mathematical subject which is totally based on calculations. It helps in decision making in the field of buissiness. These calculations learned can be further used in any types of Airline Industries. They can be used in any manufacturing industries to calculate the profit in a certain job. It can be used in marketing where it helps in allocating the budget in every product. It helps in making decisions of what to buy and when to buy and at which price. It is also used in the field of finance to analyze the flow of money.