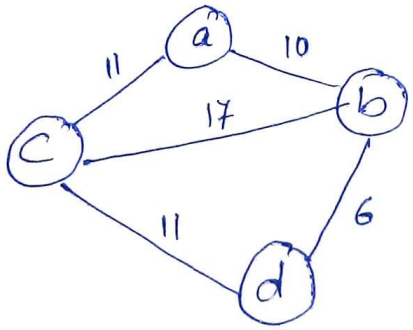
1. Consider the given graph



What is the weight of minimum spanning tree using Prims Algorithm? (Start from vertex a).

Ans:

Using Prims Algorithm

1. Select a vertex.
2. Select the next adjacent vertex such that the weight on that edge is minimum w.r.t. all other ajacent vertices
3. Now consider all the vertices in the cluster and and find the next least weighted adjacent vertex.
4. Repeat step three with the condition that no loop or cycles are formed.
5. Repeat steps 3 & 4 untill all the vertices are exhausted.
6. Stop.

(1) a

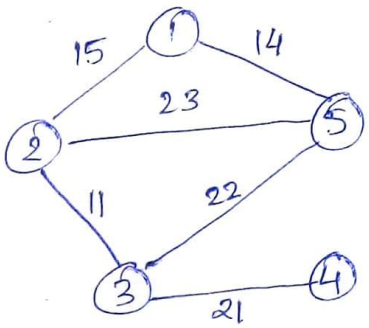
(2) a 10 b

(3) a 10 b 6 d

(4) c 11 a 10 b 6 d

∴ The weight of minimum spanning tree using prims algo. is $11+10+6 = 27$

2.) Which of the following edges form the MST of the given graph using Prims algorithm starting from vertex 4.



(i) (4-3) (5-3) (2-3) (1-2)

(ii) (4-3) (3-5) (5-1) (1-2)

(iii) (4-3) (3-5) (5-2) (1-5)

(iv) (4-3) (3-2) (2-1) (1-5)

Ans

Acc. to Prims Algorithm the MST will be.

1.) 4

2.) 3 21 4

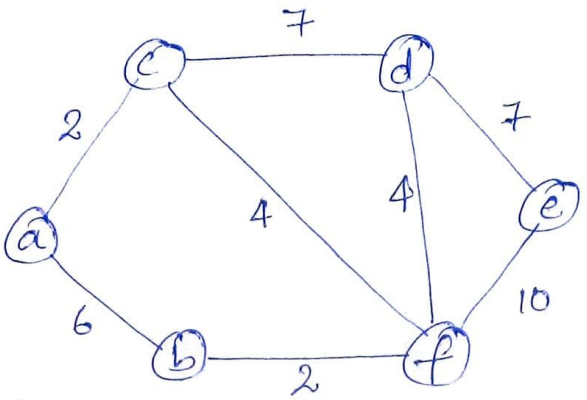
3.) 2 11 3 21 4

4.) 15 1 2 11 3 21 4

5.) 15 1 14 2 5 11 3 21 4

∴ The correct answer is option (iv)

3.) Consider the graph given below:



What is the weight of minimum spanning tree using ~~K~~ruskal's algorithm?

Ans:

Using Kruskal's Algorithm

1. Select a minimimum weighted edge
2. Select the next minimimum weighted edge:

   There are three possibilities

   (i) One (only) of the vertices already belong to the MST being build up.
   → Add the edge to that MST

   (ii) Both the vertices of the selected edge belongs to the MST (being built)
   → discard the edge (bcus it forms a circuit)

   (iii) None of the vertices of the selected edge belong to the MST (being built)
   → Start a new tree.

3. When an ~~ran~~ edge has vertices lying in seperate

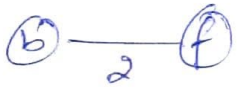
MSTs, -join them if they don't form a loop else discard that edge.

4. Repeat steps 2 & 3 until all the edges are exhausted.

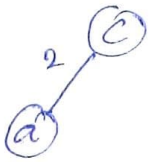
5. Stop.

< Finding MST >

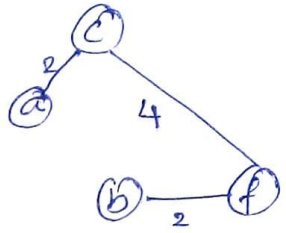
①



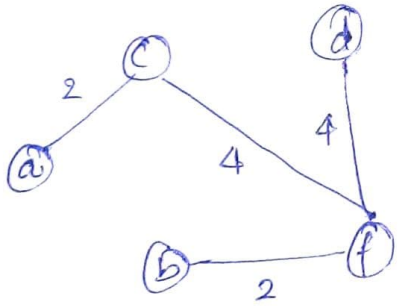
②



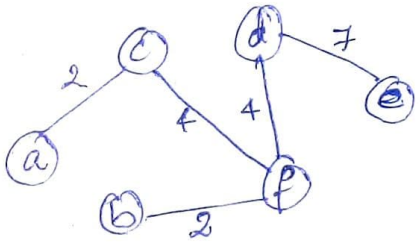
③



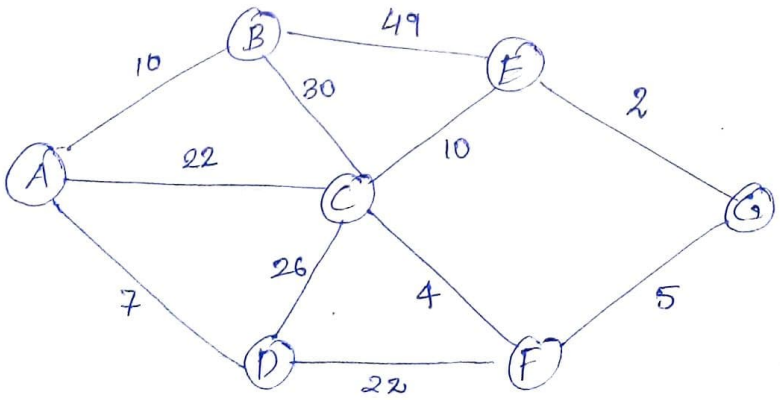
④



⑤



4.) Consider the undirected graph below:



Using Prim's algorithm to construct a MST starting at Node A, which one of the following sequence of edges represent a possible order in which the edges would be added to construct the minimum spanning tree?

A.) (E, G) (C, F) (F, G) (A, D) (A, B) (A, C)

B.) (A, D) (A, B) (A, C) (C, F) (G, E) (F, G)

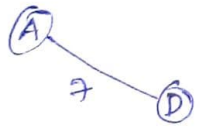
C.) (A, B) (A, D) (D, F) (F, G) (G, E) (F, C)

D.) (A, D) (A, B) (D, F) (F, C) (F, G) (G, E)

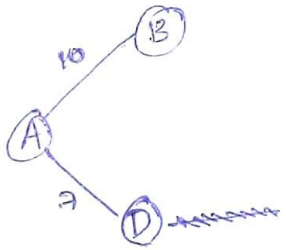
The MST will be constructed as follows ~~for~~ starting from A.

(1) A

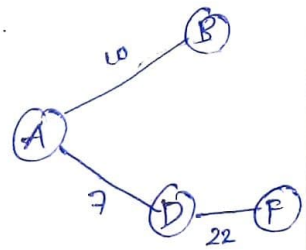
(2)



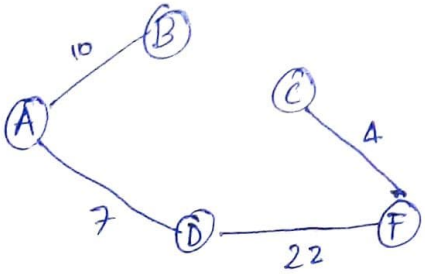
(3)



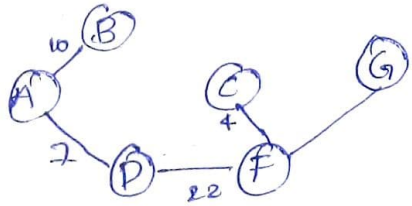
(4)



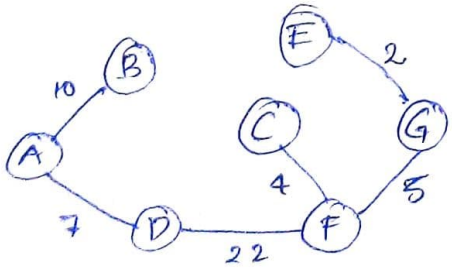
(5)



(6)



(7)



∴ The minimum spanning tree can be constructed in the order given in ~~4th position~~ as the (iv) option.