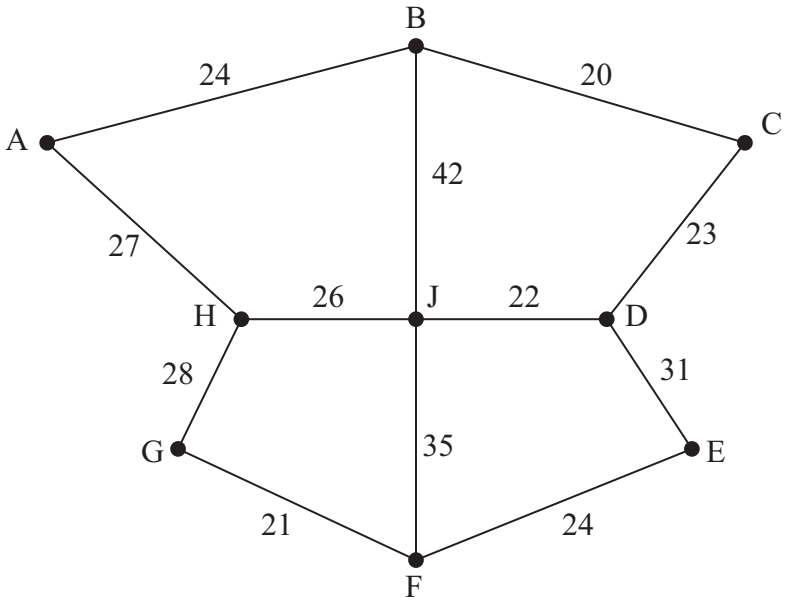
3.



(*Total weight 323 metres*)

Figure 2

Figure 2 represents a network connecting nine locations. The number on each arc is the distance in metres between the corresponding locations.

(i) (a) Explain how Kruskal's algorithm can be adapted to obtain a spanning tree of least weight that contains a specific arc.

(1)

Using the adaptation of Kruskal's algorithm from part (i)(a) on the network in Figure 2,

(b) find the spanning tree of least weight **that includes arc BJ**.
You must show your working and clearly state the order in which arcs are added.

(3)

(c) State the weight of the spanning tree found in part (i)(b).

(1)

(ii) An engineer needs to inspect the network in Figure 2. Her route must start and finish at A. She must travel along each arc at least once, minimising the length of her route.

(a) Determine the length of the engineer's route. You must make your method clear and state the arcs which need to be repeated.

(5)

On another day the engineer decides to start her route at F and end at J. She must travel along each arc at least once, minimising the length of her route.

(b) Determine how much shorter this route is than the route obtained in part (ii)(a). You must make your working clear.

(3)

(Total for Question 3 is 13 marks)