2.

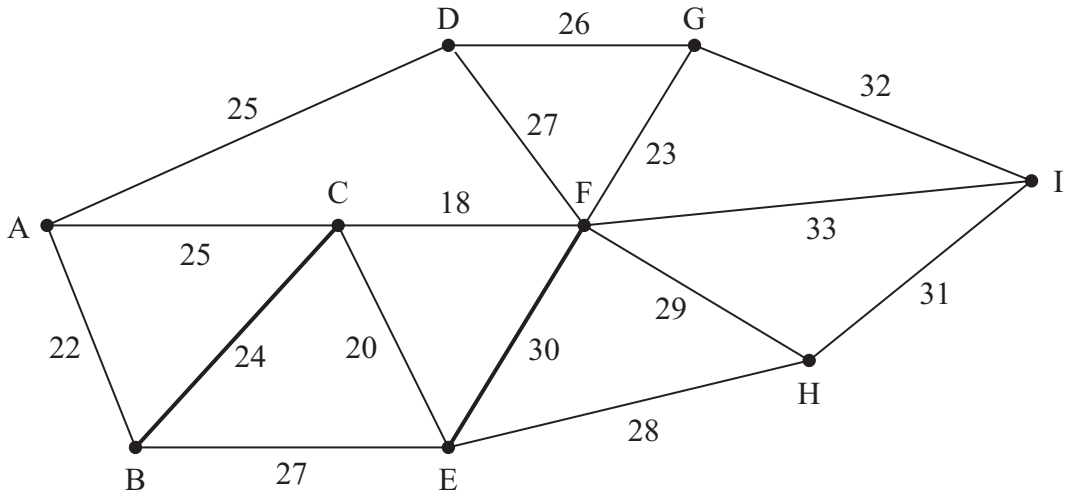

Figure 1

Figure 1 represents nine buildings, A, B, C, D, E, F, G, H and I, recently bought by Newberry Enterprises. The company wishes to connect the alarm systems between the buildings to form a single network. The number on each arc represents the cost, in pounds, of connecting the alarm systems between the buildings.

(a) Use **Prim's** algorithm, starting at A, to find the minimum spanning tree for this network. You must list the **arcs** that form your tree in the order that you select them.

(3)

(b) State the minimum cost of connecting the alarm systems in the nine buildings.

(1)

It is discovered that some alarm systems are already connected.
There are connections along **BC** and **EF**.
Since these already exist, it is decided to use these arcs as part of the spanning tree.

(c) Use **Kruskal's** algorithm to find the minimum spanning tree that includes arcs **BC** and **EF**. You must list the arcs in the order that you consider them. In each case, state whether you are adding the arc to your spanning tree.

(3)

Since arcs **BC** and **EF** already exist, there is no cost for these connections.

(d) State the new minimum cost of connecting the nine buildings.

(1)

(Total for Question 2 is 8 marks)

Question 2

Write the answer to Question 2 on these 2 pages

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Question 2 continued

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(Total for Question 2 is 8 marks)