**2.**

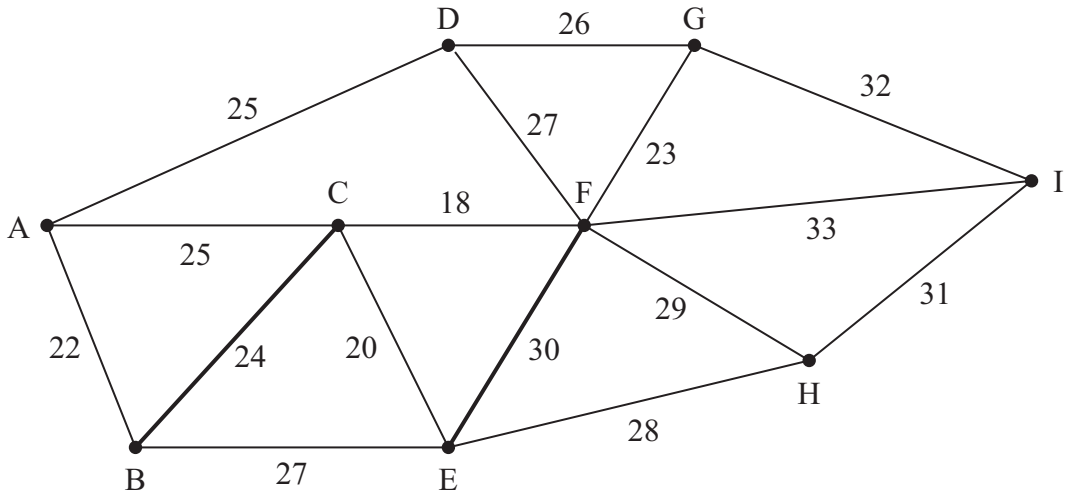



**Figure 1**

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)**