5.

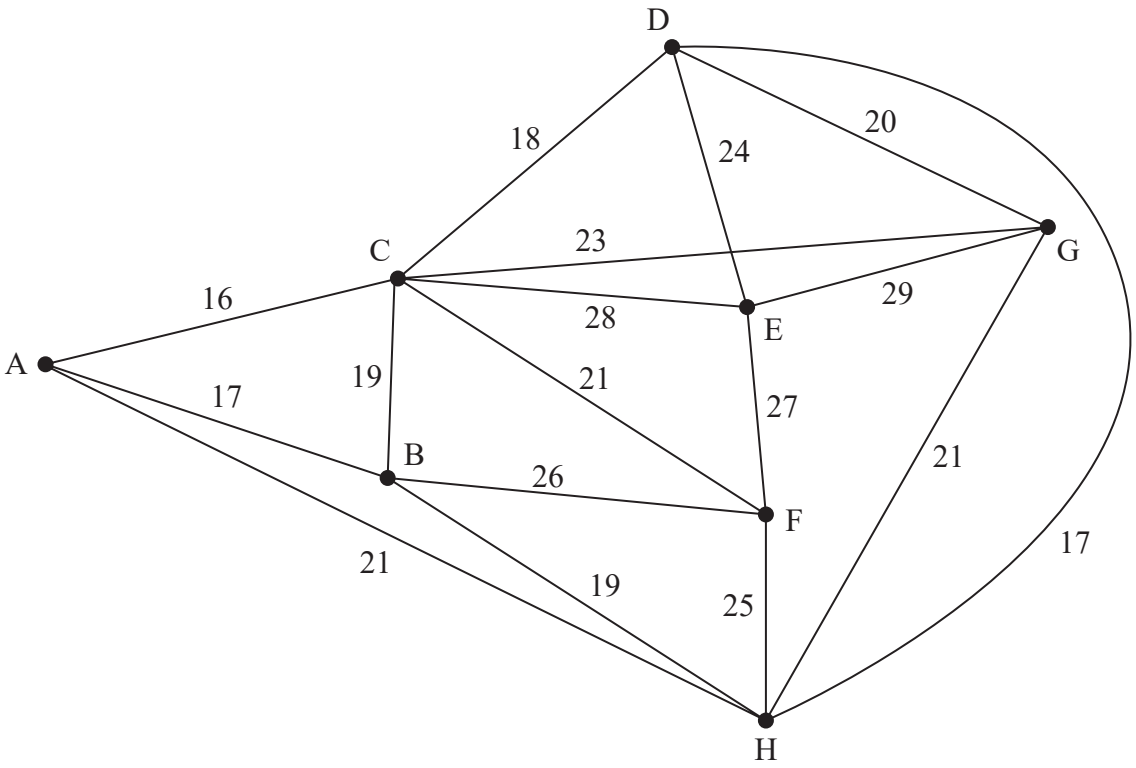


Figure 3

(a) Explain why it is impossible to draw a graph with eight vertices in which the vertex orders are 1, 2, 2, 3, 3, 4, 4 and 6

(1)

Figure 3 shows the network T. The numbers on the arcs represent the distances, in km, between the eight vertices, A, B, C, D, E, F, G and H.

(b) Determine whether or not A – C – D – E – C – B – F is an example of a path on T. You must justify your answer.

(2)

(c) Use Prim's algorithm, starting at A, to find the minimum spanning tree for T. You must clearly state the order in which you select the arcs of the tree.

(3)

(d) Draw the minimum spanning tree using the vertices given in Diagram 1 in the answer book.

(1)

The weight of arc CF is now increased to a value of x. The minimum spanning tree for T is unique and includes the same arcs as those found in (c).

(e) Write down the smallest interval that must contain x.

(2)

(Total for Question 5 is 9 marks)