3.

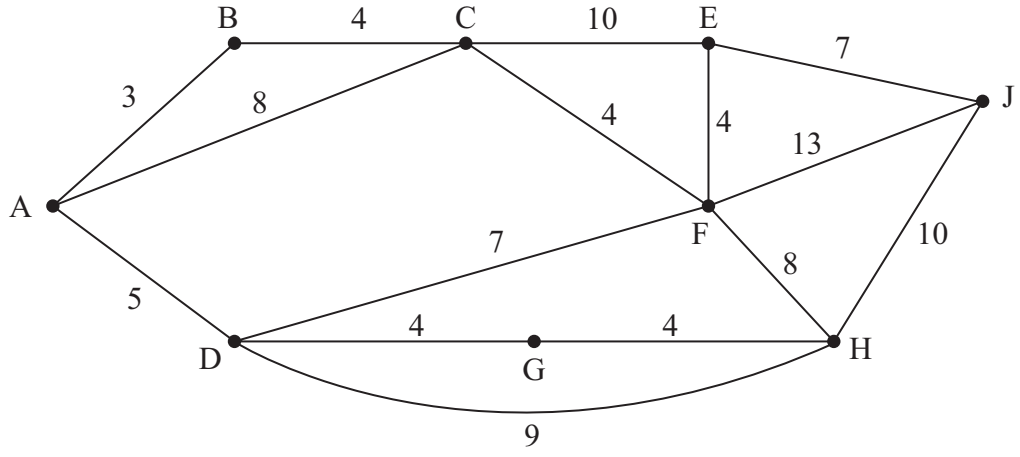


Figure 2

[*The total weight of the network is 100*]

Figure 2 represents a network of pipes in a building. The number on each arc represents the length, in metres, of the corresponding pipe.

(a) Use Dijkstra's algorithm to find the shortest path from A to J. State your path and its length.

(6)

On a particular day Kim needs to check each pipe. A route of minimum length, which traverses each pipe at least once and starts and finishes at A, needs to be found.

(b) Use an appropriate algorithm to find the arcs that will need to be traversed twice. You must make your method and working clear.

(4)

(c) Write down a possible route, giving its length.

(2)

All the pipes directly attached to B are removed. Kim needs to check all the remaining pipes and may now start at any vertex and finish at any vertex. A route is required that excludes all those pipes directly attached to B.

(d) State all possible combinations of starting and finishing points so that the length of Kim's route is minimised. State the length of Kim's route.

(3)

(Total for Question 3 is 15 marks)