6.

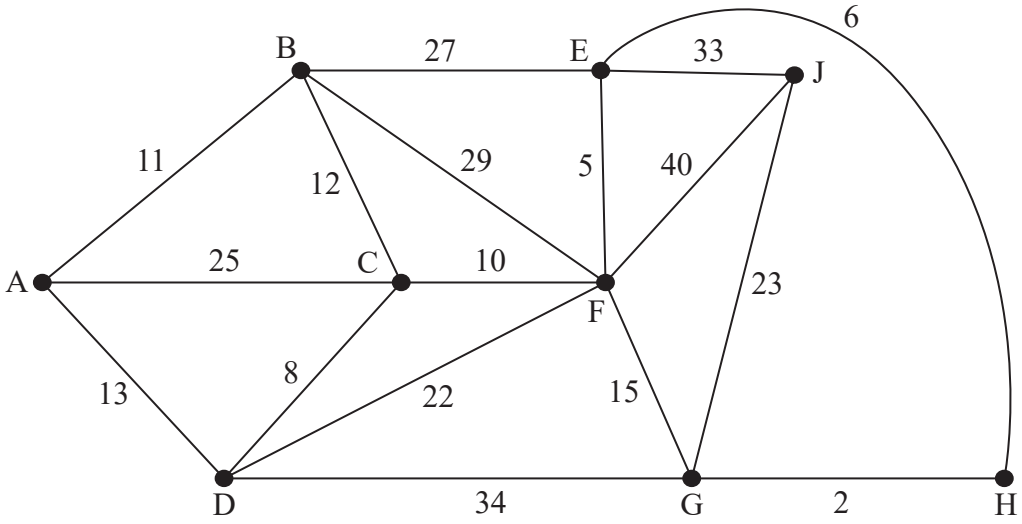


Figure 3

[*The total weight of the network is* 315]

Figure 3 represents a network of roads between nine parks, A, B, C, D, E, F, G, H and J. The number on each edge represents the length, in miles, of the corresponding road.

(a) (i) Use Dijkstra's algorithm to find the shortest path from A to J.

(ii) State the length of the shortest path from A to J.

(6)

The roads between the parks need to be inspected. Robin must travel along each road at least once. Robin wishes to minimise the length of the inspection route. Robin will start the inspection route at C and finish at E.

(b) By considering the pairings of all relevant nodes, find the length of Robin's route.

(4)

(c) State the number of times Robin will pass through G.

(1)

It is now decided to start and finish the inspection route at A. Robin must still minimise the length of the route and travel along each road at least once.

(d) Calculate the difference between the lengths of the two inspection routes.

(1)

(e) State the edges that need to be traversed twice in the route that starts and finishes at A, but do not need to be traversed twice in the route that starts at C and finishes at E.

(1)

(Total for Question 6 is 13 marks)