

# Travelling Salesman – Q1 [8 marks](16/6/21)

## Exam Boards

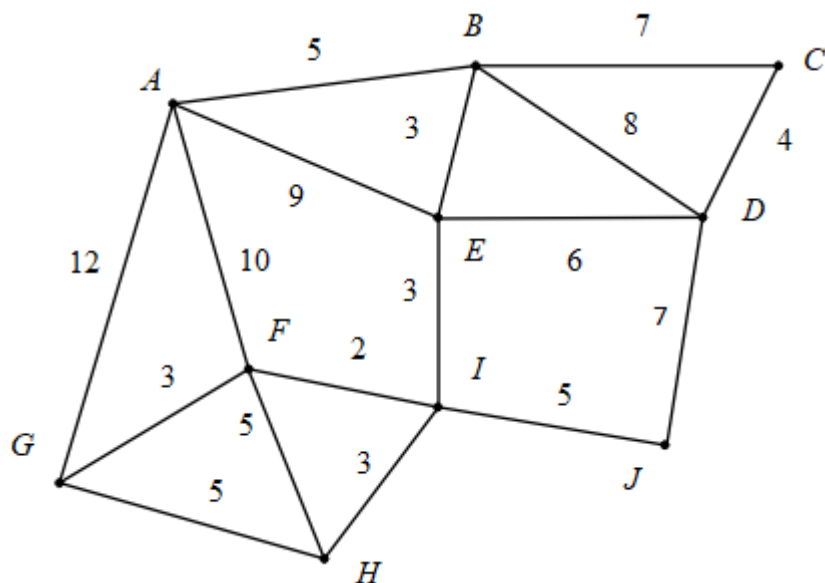
OCR : D (Year 2)

MEI: -

AQA: D (Year 1)

Edx: D1 (Year 2)

(i) For the network below, use the lower bound algorithm to find a lower bound for a Hamiltonian cycle, by isolating A. [5 marks]



(ii) Use the nearest neighbour algorithm to find an upper bound for a Hamiltonian cycle, starting at A. [3 marks]

## Solution

(i) The two shortest arcs leading from A are AB and AE, with total length 14. [1 mark]

The minimum connector for the remaining nodes can be found as follows, using Prim's algorithm (for example), starting at B:

BE 3, EI 3, IF 2, FG 3, IH 3, IJ 5, ED 6, DC 4 ; total length 29

[3 marks]

So the lower bound is  $14 + 29 = 45$ . [1 mark]

(ii) AB(5), BE(3), EI(3), IF(2), FG(3), HI(3), IJ(5), JD(7), DC(4), CB(7), BA(5) [2 marks]

Total length: 47 [1 mark]