4.3 Decision Maths: Shortest Paths and Route Inspection: 10-minute Pack

Total Marks

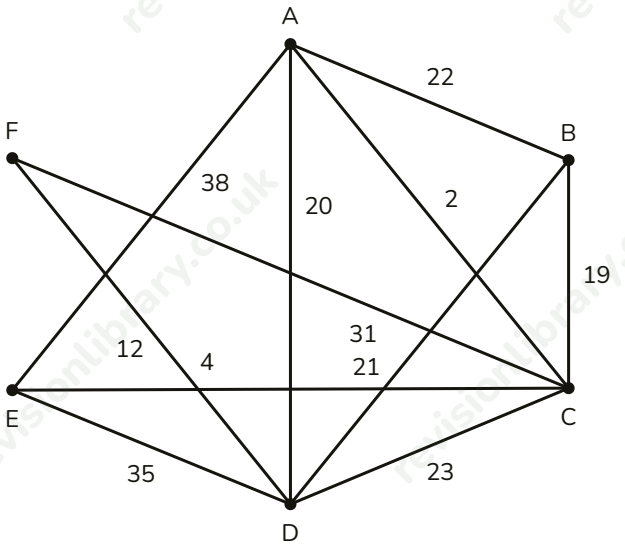
EDEXCEL 9FM0 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A network has vertices A, B, C, D, E, F and the following weighted arcs, which must all be traversed: AB = 22, AC = 2, AD = 20, AE = 38, BC = 19, BD = 21, CD = 23, CE = 4, CF = 31, DE = 35, DF = 12. The total weight of all the arcs is 227.

Diagram NOT accurately drawn



(a) Identify the vertices of odd degree. **(2)**

(b) Find the shortest distance between each pair of odd vertices, and hence find the combination of repeated arcs of least total weight that makes the network Eulerian. **(3)**

(c) Find the length of a shortest closed route that traverses every arc at least once. **(2)**

(Total for Question 1 is 7 marks)

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Mark scheme · 4.3 Decision Maths: Shortest Paths and Route Inspection: 10-minute Pack

Question 1

(a) finds the degree of every vertex	**M1**
(a) the odd vertices are B, C, D, E	**A1**
(a) Answer: B, C, D, E	
(b) finds the shortest path for each pair of odd vertices: BC = 19, BD = 21, BE = 23, CD = 22, CE = 4, DE = 26	**M1**
(b) totals the weight of each of the three pairings and compares them	**M1**
(b) optimal pairing BD, CE with extra weight 25	**A1**
(b) Answer: repeat BD, CE, extra weight 25	
(c) total weight of the network plus the extra weight	**M1**
(c) 227 + 25 = 252	**A1**
(c) Answer: 252	

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