

Examiners' Report/ Principal Examiner Feedback

January 2011

GCE

GCE Decision Mathematics D1 (6689) Paper 1

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Decision Mathematics Unit D1

Specification 6689

General

This paper proved accessible to the candidates. All questions contained marks available to the E grade candidate and there seemed to be sufficient material to challenge the A grade candidates also. In general candidates seemed well prepared for the examination and, with the possible exception of Q2c, set out their work in a clear and efficient way.

Candidates are reminded that they should not use methods of presentation that depend on colour, but are advised to complete diagrams in (dark) pencil. This remains a particular problem in the questions on matchings (question 4 on this paper)

Candidates are also reminded that this is a 'methods' paper. They need to make their method clear, 'spotting' the correct answer, with no working, rarely gains credit.

Some very poor handwriting was seen, not only making it difficult for the examiners to decipher, but with a number of candidates misreading their own writing.

Report on individual questions

Question 1

This proved a good starter and was well answered by many candidates with around 35% getting full marks and over half the candidates getting 7 or 8 marks out of 8. Nearly all candidates illustrated an understanding of Dijkstra's algorithm. A common error was to have a value of 18 at F from labelling G and F in the wrong order, giving an incorrect shortest path of 22. Some candidates did not work systematically, leading to a jumble of working values, particularly at F. Some candidates were over-zealous in crossing out working values, the examiners need to be able to read these to award marks. Those who had a final route length of 21 were able to state a correct route and able to use their answer to (b) to help with part (c), most candidates were able to use the fact that C lay on the shortest path from A to H to deduce the shortest path from C to H.

Question 2

Around 50% of the candidates gained full marks on this question showing good preparation. Most candidates scored full marks in (a), although a few did not state an integer value. Most candidates were able gain some credit in (b) although many did not place 10 in bin 1. It was good to see many correct bubble sorts in (c). Some candidates did not perform a final pass or make a statement that indicated that they had done so. A significant number of candidates wasted time in showing each exchange, or even each comparison, when they only needed to show the result of each pass. Some candidates misread their own handwriting and ended with different numbers to the ones they started with. Most candidates got at least the first two marks in (d) with a small number getting the 14 and 17 in bins 1 and 2 the wrong way round.

Question 3

Around 25% of the candidates scored full marks on this question. In part (a) a number of candidates only stated the arcs they were including in their tree and did not state the arcs that they rejected, as they rejected them. Some candidates only referred to the length of the arc rather than by its end vertices, this makes it difficult for the examiners to determine which arc is being considered. Part (b) was usually completed correctly, although some candidates referred to arcs that they had rejected. Some candidates wasted time drawing a table to run Prim, and then showed their working on the table. If they listed the arcs in order they gained full credit, but some only listed the nodes in order. Many candidates knew that Kruskal needed to be used, though some were unclear about how they would modify it. Incorrect answers included Prim, Dijkstra, Route Inspection and Hamiltonian cycle.

Question 4

Around 48% of the candidates gained full marks in this question. In part (a) many gave the correct name, although with a wide variation in spelling. Most candidates were able to find a correct alternating path, but some did not make their path clear, or show the change status step or the improved matching. Some candidates chose to show their improved matching on one of the diagrams but some failed to make their matching clear.

Question 5

Around 25% of the candidates were able to secure full marks on this question. Most candidates correctly paired up the odd nodes and found the shortest routes between them. A number of candidates stated incorrect totals and a few merely listed arcs but made no attempt to pair them. Some candidates only showed two pairings. Some omitted the route and others did not find a correct one. In part (b) most candidates attempted to add their least total to 31.6. Part (c) proved discriminating. A number of perfect solutions were seen. A number did not state clearly that FI (FHI) was the least route. A significant number stated that the repeated pairing needed to include D.

Question 6

22% of the candidates gained full marks in this question and around 80% gained full marks. Many candidates struggled to write down the constraints correctly, getting either the equation or the inequality incorrect. Common errors were; interchanging the coefficients or x and y; omitting the constant in the second inequality; reversing the inequality. Many candidates had a significant amount of working in (a), those that did answer correctly showed the most succinct working. Part (b) was often completed very well. Examiners were pleased to see more rulers in use. A number of candidates did not label the feasible region R. In (c) the majority of candidates drew a correct profit line although some drew a line with reciprocal gradient. Many candidates did not draw a line at all and used point testing losing marks. Number found the maximum point rather than the minimum point.

Question 7

This question gave rise to a good spread of marks. Many candidates completed the precedence table, the most common errors were omitting E and F for I and omitting G and H for K and L. In (b) many candidates gave a clear and correct explanation for the 6-7 dummy. Some made reference to G and H but a number made no reference to I and J. The explanation for the 8-9 dummy was poorer. All but a few candidates were able to attempt the completion of the boxes in the diagram. Errors tended to be at events 5, 7 and 8. In (d) many candidates omitted at least one critical activity, or included B as a critical activity. Most candidates showed their calculation for part (e) correctly. Part (f) was usually completed correctly, although some candidates tried to find a lower bound by drawing a scheduling diagram.

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