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Examiners' Report
Principal Examiner Feedback

Summer 2024

Pearson Edexcel GCE
Further Mathematics (8FM0)
Paper 28 Decision Mathematics 2

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GCE Mathematics: Further Mathematics June 2024
Report on Paper 8FM0 28

Introduction

The paper proved to be accessible to almost all candidates, with many demonstrating sound knowledge of all the topics. Many produced well-presented solutions, using the diagram and tables printed in the answer booklet. Candidates must be reminded to display their methods clearly, as Decision Mathematics is a method-based examination. It was pleasing to see that many more candidates than in previous years, were able to make a good attempt at answering the final question on recurrence relations.

Report on Individual Questions

Question 1

Most candidates found this question accessible and were able to answer at least some parts. Most calculated the initial flow correctly and then recognised that the capacity of SC (35) could not saturate the two arcs connected to it as their combined capacities totalled 40. However, some failed to mention that the flow of 35 was the maximum or did not compare 35 and 40 or did not give values for the capacities at all. A few focused on the flow beyond C without mention of the flow into C. Most candidates calculated the correct value for the first cut, but a number made errors with the, more complicated, second cut. Many candidates found the correct flow augmenting route, although some incorrectly tried to increase the flow in JH or HT. Although most candidates had a general idea of the maximum flow minimum cut theorem, a significant number did not answer this part of the question well. The cut was often not shown on the diagram. When it was, it sometimes went through AE instead of EH, which is not a saturated arc. Those listing the arcs of their cut occasionally omitted EF. Some just referred to a cut, C3, without showing it or listing its arcs. Most who had the correct cut stated the flow of 96 and the maximum flow/minimum cut theorem. A few stated flows of 96 and 'max flow/min cut' but scored no marks as no cut was given or shown.

Question 2

While most candidates attempted the explanation required for part (a) of this question, many of the responses were confused and lacking in detail. Candidates were also unsure of the order needed to deal with the two modifications required, with some placing large values in the prohibited cells before subtracting all values from the largest in the table. However, most candidates were able to carry out the necessary steps and produced a correctly modified table. Most candidates then correctly reduced rows and columns and applied the algorithm correctly. A relatively small number of candidates made errors in their working or failed to use the correct number of lines to cover all the zeroes in the table. A few candidates attempted this as a minimise problem instead of maximising. A small number failed to state the correct allocation, even though they had the correct final table. Almost all candidates who had the correct table stated the score correctly.

Question 3

Most candidates attempted to find the row minima and column maxima, although a small number found the row maxima and column minima instead and some candidates made a slip with one of their values. Most correctly stated that the row maximin did not equal the column minimax. Most candidates were able to correctly write down the reduced table, although some failed to transpose or retained Option Y. Many candidates wrote the correct four expressions and attempted to draw the graph, although some failed to use a ruler, or made their graph so small that it was difficult to pick out the correct point of intersection. Some candidates chose the wrong point of intersection and therefore calculated an incorrect probability. Some candidates incorrectly stated Meera's options as playing X or playing Y instead of X or Z. Many candidates failed to state the correct two options that Haruki should not play.
The final part of this question was a good discriminator, as many candidates failed to realise that the value of the game must now be zero and therefore made no progress. Those candidates who did realise the value of game, tried to set up at least one equation in k and solve it, although some made errors when doing so.

Question 4

Many candidates were able to make a good attempt at this question, with relatively few blank scripts seen. A significant number of candidates failed to realise that the model used a monthly payment and did not divide 1800 by 12. Most candidates stated a complimentary function of the correct form and many also used a trial solution of λ, although some incorrectly used $\lambda n + \mu$ as their trial solution. A small number of candidates made errors in their working, but a good number of candidates obtained the fully correct solution. A small number of candidates were penalised as they gave a solution of the form $u_{n+1} =$ instead of $u_n =$
Most candidates calculated the correct value of £5000 for D and, those who had a solution of the correct form, were able to use their solution to solve the final part of the question. A small number either made errors, either when taking logs or by not rounding their answer up. Some adopted a trial-and-error approach, which gained no credit.