Question 4

Marks	0	1	2	Average
%	88	5	8	0.2

78%

The interest component of next month's repayment

$= \dfrac{4.5\%}{12} \times 143\,585.33$

$= \$538.4449\ldots$

The reduction in the principal next month

= repayment − interest component

$= 2500 - 538.44$

$= \$1961.56$

The percentage of next month's repayment that will reduce the loan balance

$= \dfrac{1961.56}{2500} = 0.7846\ldots \approx 78.46\%$

Many students made poor attempts at this question, gave a single number as the answer or did not attempt it at all. A common incorrect answer was 22%, which was the interest component of the next repayment. A method mark was available for an incorrect answer only if the working out of a significant step towards a solution could be followed, but this was rare.

Module 5 – Networks and decision mathematics

Questions 1a.–1b.

Marks	0	1	2	Average
%	0	2	97	2

1a.
2

1b.
Miniature trains

Questions 2a.–2b.

Marks	0	1	2	Average
%	10	46	44	1.4

2a.

Task	Andrew	Brianna	Charlie	Devi
publicity	3	2	0	0
finances	0	1	2	2
equipment	0	4	3	2
catering	1	2	3	0

2b.
The minimum number of lines to cover all zeros is less than four.

Students' explanations needed to refer to the stage in the process of the Hungarian algorithm. This required reference to the required minimum number of lines though zeroes.

Some students simply stated that there was 'no clear allocation to Brianna'. Such reference to an 'allocation' does not explain how allocations might be attempted at this first stage of the algorithm. Further, if there is 'no clear allocation to Brianna', it also follows that there are no clear allocations to anybody at this stage of the algorithm.

Another common but unacceptable answer was 'there are not enough zeroes'. This answer does not indicate how many zeroes might be enough or how the zeroes would be used. Even if the table had up to 12 zeroes in three lines or columns, the Hungarian algorithm indicates that at least one further step is needed.

Questions 2ci. and 2cii.

Marks	0	1	2	Average
%	22	14	64	1.4

2ci.
Equipment

A common incorrect answer was publicity.

2cii.
36 hours

A common incorrect answer was 21, the total of all the numbers on Table 3.

Questions 3ai.–3c.

Marks	0	1	2	3	4	Average
%	6	8	12	28	45	3

3ai.
Bower, Eden

3aii.
910 km

3b.
270 km
Bower – Clement – Derrin – Eden

3c.
Between Bower and Derrin

A common incorrect answer was between Bower and Clement.

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Questions 4a.–4e.

Marks	0	1	2	3	4	5	Average
%	21	21	18	18	15	7	**2.1**

4a.
7 hours

Activities A and D are predecessors. A common incorrect answer was 11 hours, which is the earliest finishing time of F.

4b.
18 hours
Latest starting time of L
= length of critical path − duration of L
= 21 − 3 = 18

4c.
2 hours
LST − EST = 13 − 11

4d.
4 hours

Activity X is an immediate predecessor of activity G
EST of G = 11 = LST of X

EST of X
= LST of X − duration of X
= 11 − 7 = 4

4e.
$270

The longer paths are:
A-C-G-K = 21 hrs (this is the critical path)
A-D-E-H-K = 20 hrs
A-D-F-J-M = 19 hrs
A-D-E-I-M = 18 hrs
B-E-H-K = 18 hrs
B-F-J-M = 17 hrs

Reducing any path that includes A below 18 hours is pointless since B-E-H-K becomes a critical path at 18 hrs.
The critical path A-C-G-K can be reduced to 18 hours if A is reduced by three hours.
Max. reduction = 3 hrs × $90 = $270

Module 6 – Matrices

Questions 1a.–1d.

Marks	0	1	2	3	4	Average
%	1	3	12	30	54	**3.4**

1a.
4×2

Some students reversed the two numbers, writing 2×4, which was not accepted.

1b.
1850 adults