LC 2015: Paper 2

Question 1 (25 marks)

Question 1 (a)

W = Win, L = Loss

		Die 2					
		1	2	3	4	5	6
Die 1	1	[2] = L	[3] = L	[4] = L	[5] = L	[6] = L	[7] = L
	2	[3] = L	[4] = L	[5] = L	[6] = L	[7] = L	[8] = L
	3	[4] = L	[5] = L	[6] = L	[7] = L	[8] = L	[9] = W
	4	[5] = L	[6] = L	[7] = L	[8] = L	[9] = W	[10] = W
	5	[6] = L	[7] = L	[8] = L	[9] = W	[10] = W	[11] = W
	6	[7] = L	[8] = L	[9] = W	[10] = W	[11] = W	[12] = W

Marking Scheme Notes
Question 1 (a) [Scale 10C (0, 4, 8, 10)]
4: • At least one other correct entry
• Partially correct table with at least 5 correct totals or couples
8: • Five or more correct entries including at least one other loss and one other win
• Table correctly completed with totals or couples but no indication of W or L

Question 1 (b)

$$P(\text{Event}) = \frac{\text{Number of desired outcomes}}{\text{Number of possible outcomes}}$$

(i) $P(\text{W}) = \dfrac{\text{Number of wins}}{\text{Number of possible outcomes}} = \dfrac{10}{36} = \dfrac{5}{18}$

(ii) $P(\text{L}) = \dfrac{\text{Number of losses}}{\text{Number of possible outcomes}} = \dfrac{26}{36} = \dfrac{13}{18}$

$P(\text{L } \textbf{and then } \text{L } \textbf{and then } \text{L}) = \frac{13}{18} \times \frac{13}{18} \times \frac{13}{18} = 0{\cdot}3767$

Marking Scheme Notes
Question 1 (b) [Scale 10C (0, 4, 8, 10)]
4: • Favourable outcomes identified
• (i) correct only $(\frac{10}{36}, \frac{5}{18}, 0{\cdot}2\dot{7}, 0{\cdot}28, 0{\cdot}3)$
8: • (i) omitted or of no merit but (ii) $\left(\dfrac{13}{18}\right)^3$

Question 1 (c)

This is a possible outcome: L W L L L W L L L **W**

The last W *has* to happen. The other 9 letters can be in any order.

$P(\text{3W's with a W on tenth throw}) = {}^{9}C_{2}(\frac{5}{18})^{2}(\frac{13}{18})^{7} \times (\frac{5}{18}) = 0 \cdot 0791$

Marking Scheme Notes

Question 1 (c) [Scale 5C (0, 2, 4, 5)]

2: • Relevant binomial formula with some substitution
• Identifies p^7 or $(1-p)^3$ or $(1-p)^2$ or $1-p$
• Listing at least any two of the ten throws

4: • Probability of two wins in nine throws