

LC 2015 (SET B): PAPER 2

QUESTION 1 (25 MARKS)

Question 1 (a)

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6 = 1\,000\,000$$

0	7	1	7	3	7
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There are 10 ways to fill the first box and 10 ways to fill the second box and so on.

$$\text{Number of different passwords} = 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6 = 1\,000\,000$$

MARKING SCHEME NOTES

Question 1 (a) [Scale 10B (0, 4, 10)]

- 4:**
- Any work of merit e.g. Mention of 10 or 6, use of !
 - Works with relevant ${}^n P_r$ e.g. ${}^{10} P_6$
 - Partial list of possibilities, ignoring repetition. e.g. $10 \times 9 \times 8 \times 7 \times 6 \dots$
 - Answer almost correct e.g. 10^6 or $10 \times 9 \times 8 \times 7 \times 6 \times 5 = 151\,200$ or $9 \times 9 \times 9 \times 9 \times 9 \times 9 = 531\,441$
- 10:**
- Accept correct answers without work

Question 1 (b) (i)

$$9 \times 9 \times 9 \times 9 \times 9 \times 9 = 9^6 = 531\,441$$

1	7	1	7	3	7
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There are 9 ways to fill the first box and 9 ways to fill the second box and so on.

$$\text{Number of different passwords} = 9 \times 9 \times 9 \times 9 \times 9 \times 9 = 9^6 = 531\,441$$

Question 1 (b) (ii)

$$P(\text{At least one zero}) = 1 - P(\text{No zeros})$$

$$= 1 - \frac{\text{Number of passwords that do not contain zero}}{\text{Total number of passwords}}$$

$$= 1 - \frac{531\,441}{1\,000\,000}$$

$$= 0.468559$$

MARKING SCHEME NOTES

Question 1 (b) (i) (ii) [Scale 10C (0, 4, 9, 10)]

Note: Accept correct or consistent work from (a)

- 4:**
- Any work of merit e.g. Works with value from (a) reduced to exclude zero
 - Works with relevant ${}^n P_r$ e.g. ${}^9 P_6$
- 9:**
- Any one correct answer

• Two almost correct answers e.g. $9 \times 8 \times 7 \times 6 \times 5 \times 4 = 60\,480 \rightarrow P(b)(ii) = \frac{60\,480}{\text{Ans}(a)}$

- 10:**
- Accept correct answers without work

Question 1 (c)

*		*			*
1	7	1	7	3	7

In how many ways can 3 numbers be selected from the 6 numbers in his password?

$${}^6C_3 = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$$

Author's note: Selections are not on the Ordinary Level course. **Question 1 (c)** should not have been on the paper.

MARKING SCHEME NOTES**Question 1 (c) [Scale 5B (0, 3, 5)]**

Note: Accept correct or consistent work from (a)

3: • Any work of merit

5: • Correct answer without work