

**LC 2013 (SET D): PAPER 2****QUESTION 1 (25 MARKS)****Question 1 (a)**

Each player tosses more than 50% heads.

**Question 1 (b)**

Number of heads tossed =  $109 + 238 + 291 = 638$

Total number of tosses =  $200 + 400 + 500 = 1100$

$$P(\text{Head}) = \frac{\text{Number of heads tossed}}{\text{Total number of tosses}} = \frac{638}{1100} = 0.58$$

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

**Question 1 (c)**

$$P(\text{Head}) = 0.58$$

$$P(\text{Tail}) = 1 - 0.58 = 0.42$$

$P(\text{Head and then Head and then Head})$

$$= 0.58 \times 0.58 \times 0.58 \approx 0.195$$

**AND/OR**

**AND:** Multiply

$P(A)$  and then  $P(B)$ :  $P(A) \times P(B)$

**OR:** Add

$P(A)$  or  $P(B)$ :  $P(A) + P(B)$

$P(\text{Tail and then Tail})$

$$= 0.42 \times 0.42 \approx 0.176$$

$P(\text{Head and then Head and then Head}) \neq P(\text{Tail and then Tail})$

Joe's claim is not true.

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

- 3:**
- States one or two players throw more heads than tails
  - Gives an indication that  $109 > 100$  or  $238 > 200$

**Question 1 (b) [Scale 10C (0, 4, 7, 10)]**

- 4:**
- Finds the correct total number of heads or throws
  - Calculates the correct probability for one player
- 7:**
- Finds the total number of heads and throws
  - Calculates the probability using the totals but one element of the fraction incorrect
  - Calculates the correct probability for each of the three players individually

**Question 1 (c) [Scale 10C (0, 4, 7, 10)]**

- 4:**
- Writes the correct probability for three heads or two tails
  - Calculates the correct probability for three heads and two tails using a fair coin
- 7:**
- Calculates the correct probability for three heads and two tails but with an incorrect or omitted statement
  - Fully correct answer using a fair coin