

SAMPLE PAPER 6: PAPER 1

QUESTION 2 (25 MARKS)

Question 2 (a)

A standard pack of playing cards has four suits (diamonds (red), hearts (red), spades (black), clubs (black)). Each suit has 13 cards, including an ace, three face cards (king, queen, jack) and cards numbers 2 to 10, giving 52 cards in total.

$$(i) P(\text{Black card}) = \frac{\text{Number of black cards}}{\text{Total number of cards}} = \frac{26}{52} = \frac{1}{2}$$

$$(ii) P(\text{Jack}) = \frac{\text{Number of jacks}}{\text{Total number of cards}} = \frac{4}{52} = \frac{1}{13}$$

$$(iii) P(\text{Jack of diamonds}) = \frac{\text{Number of jack of diamonds}}{\text{Total number of cards}} = \frac{1}{52}$$

Question 2 (b)

$$(i) P(\text{Either a face card or a diamond}) \\ = P(\text{Face card}) + P(\text{Diamond}) - P(\text{Face card and a diamond}) \\ = \frac{12}{52} + \frac{13}{52} - \frac{3}{52} = \frac{22}{52} = \frac{11}{26}$$

$$(ii) P(4 \text{ of spades}) \text{ and then } P(4 \text{ of spades}) \text{ [with replacement]} \\ = \frac{1}{52} \times \frac{1}{52} = \frac{1}{2704}$$

Question 2 (c)

Write out all the possibilities for tossing a coin three times:

HHH, HHT, HTH, THH, HTT, THT, TTH, TTT (Eight outcomes)

(i) HHH, **HHT**, **HTH**, **THH**, HTT, THT, TTH, TTT (Eight outcomes)

$$P(2 \text{ heads and 1 tail}) = \frac{3}{8}$$

(ii) **HHH**, HHT, HTH, THH, HTT, THT, TTH, TTT (Eight outcomes)

$$P(3 \text{ heads}) = \frac{1}{8}$$

(iii) HHH, HHT, **HTH**, **THH**, HTT, THT, TTH, TTT (Six outcomes)

$$P(2 \text{ heads and 1 tail with the second head on the third roll}) = \frac{2}{8} = \frac{1}{4}$$
