Probability

Question Paper 3

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Probability
Sub Topic	
Booklet	Question Paper 3

Time Allowed: **62 minutes**

Score: **/ 51**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1   On average, 2 apples out of 15 are classifie as being underweight. Find the probability that in a random sample of 200 apples, the number of apples which are underweight is more than 21 and less than 35.   [5]

2   Three friends, Rick, Brenda and Ali, go to a football match but forget to say which entrance to the ground they will meet at. There are four entrances, A, B, C and D. Each friend chooses an entrance independently.

- The probability that Rick chooses entrance A is $\frac{1}{3}$. The probabilities that he chooses entrances B, C or D are all equal.

- Brenda is equally likely to choose any of the four entrances.

- The probability that Ali chooses entrance C is $\frac{2}{7}$ and the probability that he chooses entrance D is $\frac{3}{5}$. The probabilities that he chooses the other two entrances are equal.

   (i) Find the probability that at least 2 friends will choose entrance B.   [4]

   (ii) Find the probability that the three friends will all choose the same entrance.   [4]

3   It was found that 68% of the passengers on a train used a cell phone during their train journey. Of those using a cell phone, 70% were under 30 years old, 25% were between 30 and 65 years old and the rest were over 65 years old. Of those not using a cell phone, 26% were under 30 years old and 64% were over 65 years old.

   (i) Draw a tree diagram to represent this information, giving all probabilities as decimals.   [2]

   (ii) Given that one of the passengers is 45 years old, f nd the probability of this passenger using a cell phone during the journey.   [3]

4   A box contains 4 pears and 7 oranges. Three fruits are taken out at random and eaten. Find the probability that

   (i) 2 pears and 1 orange are eaten, in any order,   [3]

   (ii) the third fruit eaten is an orange,   [3]

   (iii) the f rst fruit eaten was a pear, given that the third fruit eaten is an orange.   [3]

   There are 121 similar boxes in a warehouse. One fruit is taken at random from each box.

   (iv) Using a suitable approximation, f nd the probability that fewer than 39 are pears.   [5]

5   Maria chooses toast for her breakfast with probability 0.85. If she does not choose toast then she has a bread roll. If she chooses toast then the probability that she will have jam on it is 0.8. If she has a bread roll then the probability that she will have jam on it is 0.4.

    (i) Draw a fully labelled tree diagram to show this information.   [2]

    (ii) Given that Maria did **not** have jam for breakfast, f nd the probability that she had toast.   [4]

6 **(a)** **(i)** Find how many different four-digit numbers can be made using only the digits 1, 3, 5 and 6 with no digit being repeated.   [1]

      (ii) Find how many different odd numbers greater than 500 can be made using some or all of the digits 1, 3, 5 and 6 with no digit being repeated.   [4]

  (b) Six cards numbered 1, 2, 3, 4, 5, 6 are arranged randomly in a line. Find the probability that the cards numbered 4 and 5 are **not** next to each other.   [3]

7   On a production line making toys, the probability of any toy being faulty is 0.08. A random sample of 200 toys is checked. Use a suitable approximation to f nd the probability that there are at least 15 faulty toys.   [5]