Probability distribution table
Question Paper 4

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Descrete random variables
Sub Topic	Probability distribution table
Booklet	Question Paper 4

Time Allowed: **57 minutes**

Score: **/ 47**

Percentage: **/100**

Grade Boundaries:

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

1 A box contains 5 discs, numbered 1, 2, 4, 6, 7. William takes 3 discs at random, without replacement, and notes the numbers on the discs.

   (i) Find the probability that the numbers on the 3 discs are two even numbers and one odd number.

                                                                             [3]

The smallest of the numbers on the 3 discs taken is denoted by the random variable S.

 (ii) By listing all possible selections (126, 246 and so on) draw up the probability distribution table for S.   [5]

2 A pet shop has 9 rabbits for sale, 6 of which are white. A random sample of two rabbits is chosen without replacement.

   (i) Show that the probability that exactly one of the two rabbits in the sample is white is $\frac{1}{2}$.   [2]

 (ii) Construct the probability distribution table for the number of white rabbits in the sample.   [3]

(iii) Find the expected value of the number of white rabbits in the sample.   [1]

3 A book club sends 6 paperback and 2 hardback books to Mrs Hunt. She chooses 4 of these books at random to take with her on holiday. The random variable X represents the number of paperback books she chooses.

    (i) Show that the probability that she chooses exactly 2 paperback books is $\frac{3}{14}$.   [2]

    (ii) Draw up the probability distribution table for X.   [3]

    (iii) You are given that E(X) = 3. Find Var(X).   [2]

4 Coin A is weighted so that the probability of throwing a head is $\frac{2}{3}$. Coin B is weighted so that the probability of throwing a head is $\frac{1}{4}$. Coin A is thrown twice and coin B is thrown once.

    (i) Show that the probability of obtaining exactly 1 head and 2 tails is $\frac{13}{36}$.   [3]

    (ii) Draw up the probability distribution table for the number of heads obtained.   [4]

    (iii) Find the expectation of the number of heads obtained.   [2]

5 A pet shop has 6 rabbits and 3 hamsters. 5 of these pets are chosen at random. The random variable X represents the number of hamsters chosen.

    (i) Show that the probability that exactly 2 hamsters are chosen is $\frac{10}{21}$.   [2]

    (ii) Draw up the probability distribution table for X.   [4]

6   Susan has a bag of sweets containing 7 chocolates and 5 toffees. Ahmad has a bag of sweets containing 3 chocolates, 4 toffees and 2 boiled sweets. A sweet is taken at random from Susan's bag and put in Ahmad's bag. A sweet is then taken at random from Ahmad's bag.

    (i) Find the probability that the two sweets taken are a toffee from Susan's bag and a boiled sweet from Ahmad's bag.   [2]

   (ii) Given that the sweet taken from Ahmad's bag is a chocolate, find the probability that the sweet taken from Susan's bag was also a chocolate.   [4]

  (iii) The random variable X is the number of times a chocolate is taken. State the possible values of X and draw up a table to show the probability distribution of X.   [5]