2. (i) Nima wants to investigate the distribution of a discrete random variable X

The unknown mean of the distribution is μ

Nima takes a sample and finds the sample mean, $\bar{x}$

For **each** of the following, state whether or not it is a statistic. Give a reason for your answer in each case.

(a) μ

(b) $\bar{x}$

(2)

(ii) A discrete random variable Y has the sampling distribution given in the table below.

y	2	5	6
$P(Y = y)$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{5}{12}$

Two random independent observations of Y are taken.

Find the probability that the value of the first observation of Y is smaller than the value of the second observation of Y

(3)

(iii) A bag contains three counters, numbered 3, 4 and 5 respectively. Two counters are drawn at random, one after the other without replacement.

(a) List all the possible combinations of the scores on the two counters.

(1)

The random variable T is defined as

T = number on the first counter + (2 × number on the second counter)

(b) List all the possible values of T

(2)

(c) Find the sampling distribution of T

(3)

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Question 2 continued

(Total for Question 2 is 11 marks)