Write your name here

Surname	Other Names

AS/A Level Mathematics

Discrete Random Variables

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled..
- Answer the questions in the spaces provided
– there may be more space than you need.
- You should show sufficient working to make your methods clear.
Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

1 A discrete random variable X has the probability function:

x	0	1	2	3
$P(X = x)$	0.2	a	0.3	0.25

(a) Find the value of a **(1)**

(b) Find $P(X > 1.2)$ **(1)**

(c) Construct a table for the cumulative distribution $F(x)$ **(2)**

(Total for question 1 is 4 marks)

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2 A random variable X has the probability function:

$$P(X = x) = \frac{(2x - 1)}{36} \qquad x = 1, 2, 3, 4, 5, 6$$

(a) Construct a table giving the probability function of X. **(2)**

(b) Find $P(1.4 < X < 3.9)$ **(1)**

(c) Construct a table for the cumulative distribution $F(x)$ **(2)**

(Total for question 2 is 5 marks)

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3 A fair 6 sided die is rolled. The random variable Y represents the score on the die.

(a) Construct a table giving the probability function of Y. **(2)**

(b) Write down the name of this distribution **(1)**

(Total for question 3 is 3 marks)

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4 A discrete random variable X has the probability distribution:

x	0	1	2	3
$P(X = x)$	0.2	a	0.3	b

Where a and b are constants.

The cumulative distribution $F(x)$ of X is given below.

x	0	1	2	3
$F(x)$	c	d	0.78	e

Where c, d and e are constants.

Find the values of a, b, c, d and e.

(Total for question 4 is 3 marks)