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Pearson Edexcel International Advanced Level

Time 1 hour 30 minutes

Paper
reference

WST02/01

Mathematics

International Advanced Subsidiary/Advanced Level Statistics S2

You must have:

Mathematical Formulae and Statistical Tables (Yellow), calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. 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, centre number and candidate number.
- 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.
- Values from the statistical tables should be quoted in full. If a calculator is used instead of the tables, the value should be given to an equivalent degree of accuracy.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 6 questions in this question paper. The total mark for this paper is 75.
- 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.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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3. *Superbounce* is a manufacturer of tennis balls.

It knows from past records that 10% of its tennis balls fail a bounce test.

(a) Find the probability that from a random sample of 10 of these tennis balls

- (i) at least 4 fail the bounce test
- (ii) more than 1 but fewer than 5 fail the bounce test.

(4)

The managing director makes changes to the production process and claims that these changes will reduce the probability of its tennis balls failing the bounce test.

After the changes were made a random sample of 50 of the tennis balls were tested and it was found that 2 failed the bounce test.

(b) Test, at the 5% significance level, whether or not this result supports the managing director's claim.

(4)

In a second random sample of n tennis balls it was found that none failed the bounce test. As a result of this sample, the managing director's claim is supported at the 1% significance level.

(c) Find the smallest possible value of n

(3)

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5. A company produces steel cable.

Defects in the steel cable produced by this company occur at random, at a constant rate of 1 defect per 16 metres.

On one day the company produces a piece of steel cable 80 metres long.

- (a) Find the probability that there are at most 5 defects in this piece of steel cable. (2)

The company produces a piece of steel cable 80 metres long on each of the next 4 days.

- (b) Find the probability that fewer than 2 of these 4 pieces of steel cable contain at most 5 defects. (4)

The following week the company produces a piece of steel cable x metres long.

Using a normal approximation, the probability that this piece of steel cable has fewer than 26 defects is 0.5398

- (c) Find the value of x (8)

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