

Write your name here

Surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Biology

Advanced

Unit 6: Practical Biology and Investigative Skills

Friday 12 May 2017 – Afternoon

Time: 1 hour 30 minutes

Paper Reference

WBI06/01

You must have:

Calculator, HB pencil, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, including your use of grammar, punctuation and spelling.
- Candidates may use a calculator.

Advice

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

Turn over ►

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Pearson

Answer ALL questions.

1 Fibres such as flax and jute are obtained from plants.

These fibres can be used to make man-made materials stronger.

(a) Describe an experiment to compare the tensile strength of flax and jute fibres.

(5)

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(b) (i) State **two** variables, other than the independent variable, that could affect this experiment.

(2)

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(ii) Choose **one** of the variables you have identified in (i). Explain how this variable could be controlled. Describe what effect it could have on the results if it is not controlled.

(2)

Variable

How this variable could be controlled

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Effect it could have on the results if it is not controlled

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(c) Suggest why flax and jute fibres decompose slowly.

(3)

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(Total for Question 1 = 12 marks)



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2 The photograph below shows *Garra barrimiae*, a species of fish that feeds on aquatic plants.



Magnification $\times 1.5$

These fish live in rivers that only flow for a short time after rainfall. The fish become trapped in pools for several months in the dry season.

A student noticed that, at the end of the dry season, the fish in different pools were different sizes.

The student investigated the sizes of fish in two pools, **A** and **B**.

(a) Write a null hypothesis for this investigation.

(2)

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- (b) The student caught a sample of fish from each pool. The length of each fish was measured and recorded.

The results are shown below.

Pool A

51mm, 39mm, 45mm, 38mm, 35mm, 32mm, 39mm, 47mm,
40mm, 41mm, 31mm, 42mm, 43mm, 50mm, 44mm

Pool B

45mm, 54mm, 50mm, 48mm, 45mm, 44mm, 41mm, 43mm,
47mm, 37mm, 48mm, 42mm, 50mm, 42mm, 46mm

- (i) Calculate the mean length of the fish for pool **A** and for pool **B**.

In the space below, draw a table to show the raw data and your calculated mean values.

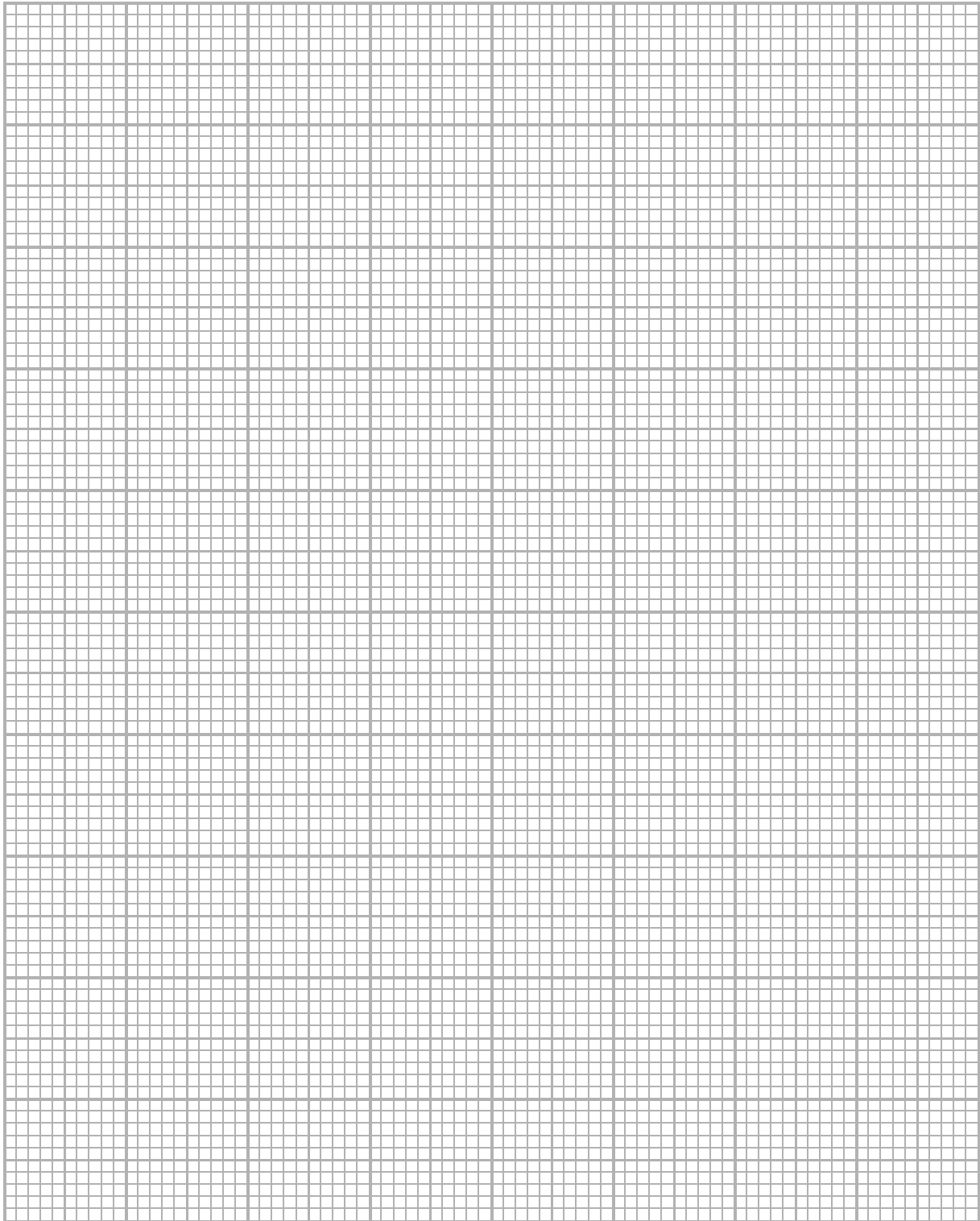
(3)



(ii) On the graph paper below, draw a suitable graph to compare the mean length of the fish from pool **A** and from pool **B**.

Indicate on your graph the variability of the data.

(3)



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(c) The student carried out a t -test to analyse the data.

The analysis produced a value of $t = 2.31$

The number of degrees of freedom is calculated using the formula

$$\text{degrees of freedom} = (n_1 - 1) + (n_2 - 1)$$

where n_1 and n_2 represent the size of each sample.

The table below can be used to find the critical value of t for this investigation.

Number of degrees of freedom	Significance level	
	$p = 0.05$	$p = 0.01$
14	2.15	2.98
15	2.13	2.95
16	2.12	2.92
17	2.11	2.90
18	2.10	2.88
19	2.09	2.86
20	2.09	2.85
25	2.06	2.79
28	2.05	2.76
60	2.00	2.66

What conclusions can be drawn from this investigation?

Use information from the table and your graph to help explain your answer.

(4)

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(d) Suggest how this investigation could be modified to identify factors affecting the size of the fish in the pools.

(4)

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(Total for Question 2 = 16 marks)



3 The photograph below shows oregano, a plant used to flavour food. Some of the chemicals produced by this plant may have antimicrobial properties.



Magnification $\times 1$

(a) Suggest how a plant may benefit from producing a chemical with antimicrobial properties. (2)

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(b) Plan an investigation to determine which part of the oregano plant has the highest concentration of chemicals with antimicrobial properties.

Your answer should give details under the following headings.

(i) A description of appropriate preliminary work that you might carry out to ensure your proposed method would provide meaningful data.

(3)

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- (ii) A detailed method, including an explanation of how important variables are to be controlled or monitored.

[2 marks are available in this section for the quality of written communication.]

(10)

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(iii) A clear explanation of how your data are to be recorded, presented and analysed in order to draw conclusions from your investigation.

(4)

(iv) The limitations of your proposed method.

(3)

(Total for Question 3 = 22 marks)

TOTAL FOR PAPER = 50 MARKS

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