Write your name here

Surname	Other names

Pearson Edexcel
International
Advanced Level

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Advanced

Unit 6: Practical Biology and Investigative Skills

Wednesday 13 May 2015 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
WBI06/01

You must have:
Ruler, Calculator, HB Pencil

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.
- Any blank pages are indicated.

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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P 4 4 8 7 5 A 0 1 1 6

PEARSON

Answer ALL questions.

1 Effective treatment of bacterial infections requires the selection of the most suitable antibiotic.

(a) Describe an experiment to investigate the effect of different antibiotics on **one** species of bacteria.

(5)

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

(2)

.....

.....

(ii) Suggest how **one** of the variables you have stated in (b)(i) could be controlled. Describe what effect it could have on the results if it is not controlled.

(2)

Variable .....

How to control the variable .....

.....

.....

.....

Effect on the results if the variable is not controlled .....

.....

.....

.....

(c) Give a reason for **one** safety precaution that needs to be taken in this investigation.

(1)

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(d) Tetracycline is an antibiotic that binds to bacterial ribosomes. Suggest how tetracycline works as an antibiotic.

(2)

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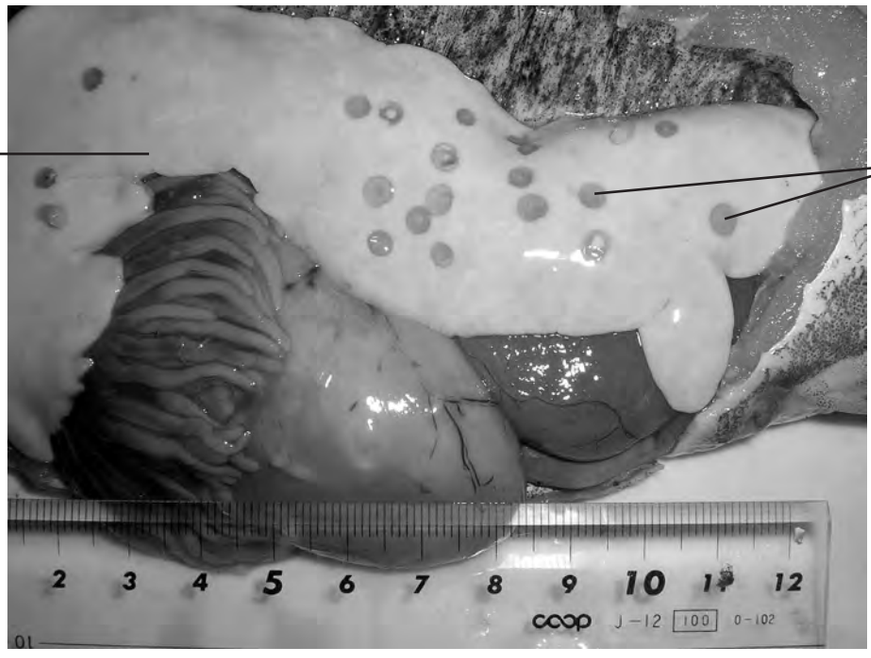
(Total for Question 1 = 12 marks)

2 *Anisakis simplex* is a parasitic worm. The larvae of *A. simplex* infect marine fish.

The photograph below shows larvae on the surface of the liver of an infected fish.



Four students, A, B, C and D, decided to investigate if there is a difference in the number of these larvae found on the livers of male and female fish.

(a) Write a suitable null hypothesis for this investigation.

(2)

(b) For each fish examined, the students recorded the sex of the fish (female ♀ or male ♂) and the number of larvae observed.

The results collected by the students are shown below.

Student A

♀ 12, ♂ 4,

♀ 9, ♂ 7, ♀ 0

Student B

♀ 5, ♂ 8, ♂ 1

Student C

♀ 0, ♂ 2, ♀ 18

Student D

♀ 2, ♂ 11, ♂ 6,

♂ 2, ♀ 25

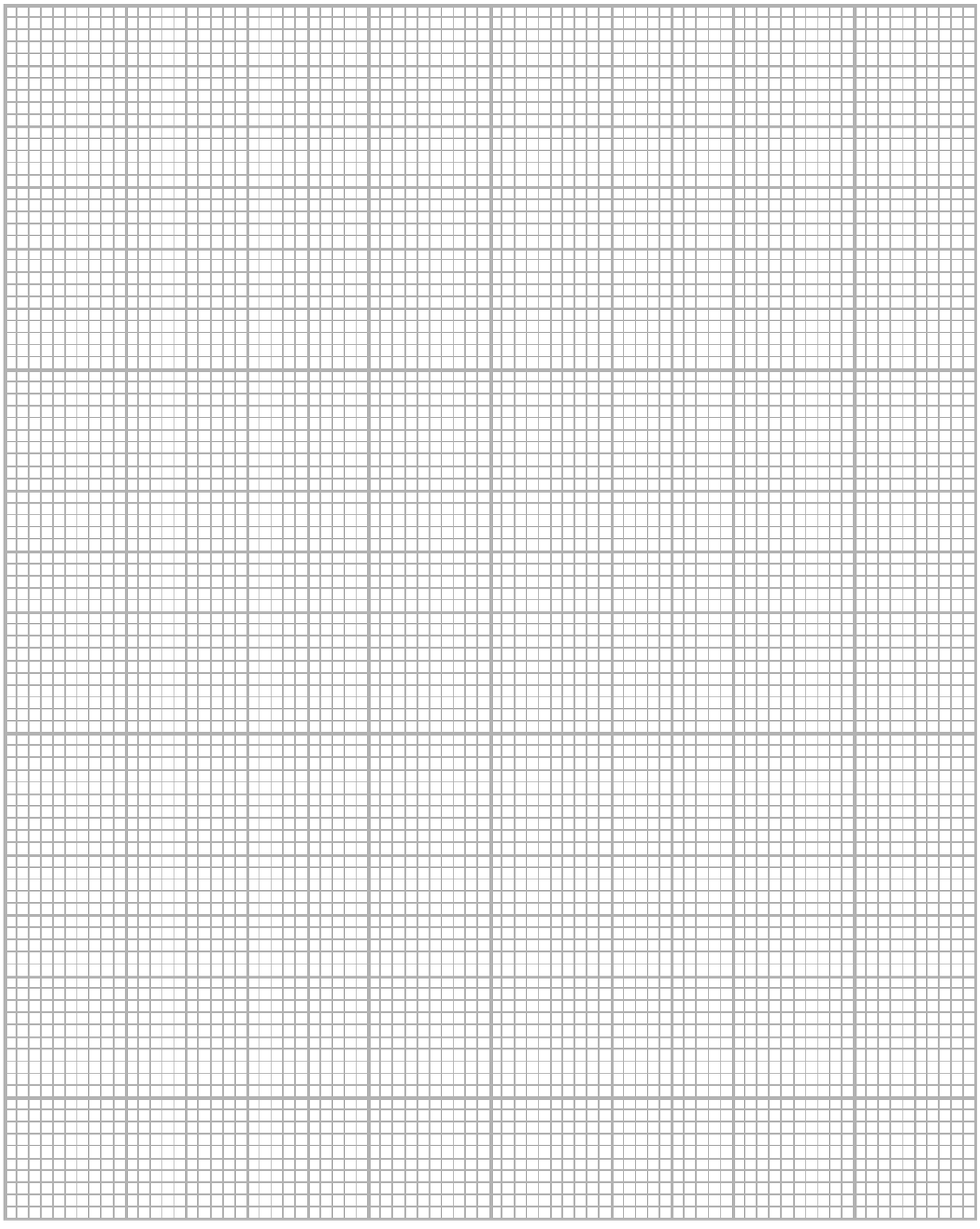
(i) Calculate the mean number of larvae found in male and female fish.

Prepare a suitable table to display the raw data and your calculated mean values.

(3)

(ii) On the graph paper below, draw a suitable graph to compare the mean number of larvae and the variability of the data in male and in female fish.

(3)



(c) The students carried out a Chi-squared test to analyse their results.

This test is used to determine if the difference between the mean number of larvae observed and the expected number of larvae is significant.

The calculated value of Chi-squared for these results was found to be 8.03 with one degree of freedom.

The table below shows some critical values for the Chi-squared test.

Degrees of freedom	Probability level		
	0.05	**0.01**	**0.001**
1	3.84	6.64	10.83
2	5.99	9.21	13.82
3	7.82	11.34	16.27

What conclusion can be drawn from the investigation?

Use this information and your graph to explain your answer.

(4)

(d) Suggest why any conclusions drawn from this investigation may not be valid.

(3)

(Total for Question 2 = 15 marks)

3 A student observed that vegetables are often cooked and then kept warm for a period of time before being eaten.

The student formulated the following hypothesis:

The longer the vegetables are kept warm after cooking the lower their vitamin C concentration.

Plan an investigation to test this hypothesis, using one named vegetable.

Your answer should give details under the following headings.

(a) A consideration of whether there are any safety or ethical issues that you would need to take into account.

(2)

(b) A description of appropriate preliminary practical work that you might undertake to ensure your proposed method would provide meaningful data.

(4)

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

(10)

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

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

(4)

(e) The limitations of your proposed method.

(3)

(Total for Question 3 = 23 marks)

TOTAL FOR PAPER = 50 MARKS

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