Write your name here

Surname	Other names

Centre Number | | | | | |

Candidate Number | | | | |

Edexcel GCE

Biology

Advanced

Unit 6B: Practical Biology and Investigative Skills

Wednesday 25 May 2011 – Morning
Time: 1 hour 30 minutes

Paper Reference
6BI08/01

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.*

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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Answer ALL questions

1 Many scientists are concerned about the effect climate change could have on the development of organisms. Climate change could have an effect on the yield of many important farmed foods, such as maize, wheat, rice and fish.

(a) Describe an experiment to investigate the effect of temperature (the independent variable) on the development of organisms such as seedlings or brine shrimps. Include details of a suitable **dependent** variable.

(5)

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

(2)

(ii) Choose **one** of the variables from (i). Suggest how this variable could have been controlled. Describe what effect it could have had on the results if it had not been controlled.

(2)

Variable .....

How to control the variable .....

.....

.....

.....

Effect on the results if the variable had not been controlled .....

.....

.....

.....

(c) Some plants are adapted to live in low environmental temperatures.
When the environmental temperature increases the gross primary productivity increases, but the net primary productivity decreases. This may cause the yield of some crops to decrease.

Explain why an increase in environmental temperature causes the yield of some crops to decrease.

(4)

(Total for Question 1 = 13 marks)

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2 A student decided to investigate whether eating breakfast every day had an effect on the body mass of students in her class.

She selected twelve students (A to L), measured their body mass and asked if they ate breakfast regularly.

A copy of her raw results is shown below.

A 66kg, B 55kg, C 63kg, D 68kg, E 72kg, F 65kg,

G 71kg, H 58kg, I 75kg, J 61kg, K 73kg, L 59kg.

Do they eat breakfast regularly?

A yes, B yes, C no, D yes, E no, F no, G no,

H yes, I no, J yes, K no, L yes.

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

(1)

.....

.....

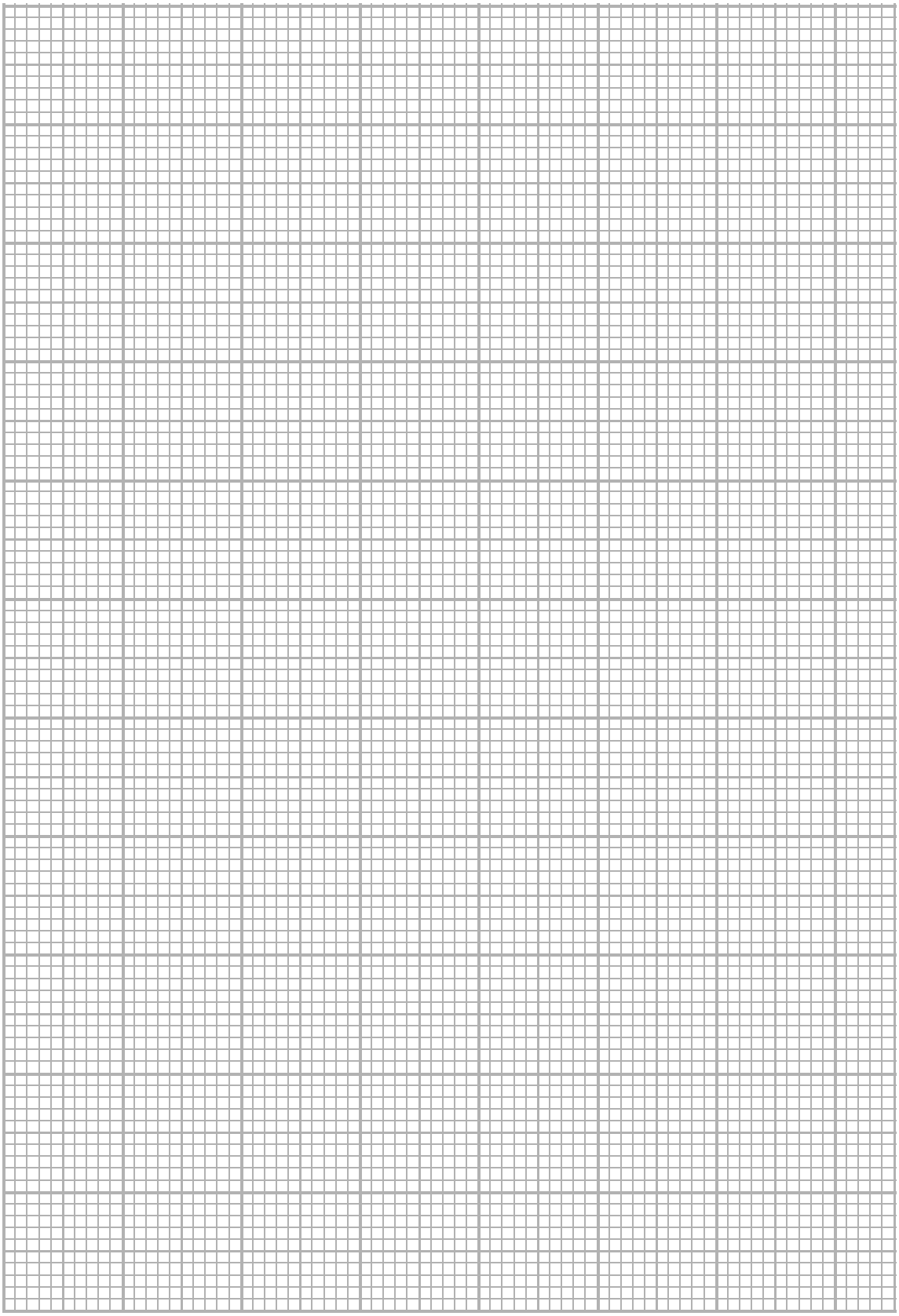
.....

(b) Prepare a suitable table to display the data obtained and calculate the mean body mass for students who regularly eat breakfast and those who do not.

(4)

(c) Using a suitable graphical form, compare the effects of eating breakfast regularly or not on the body mass of these students.

(3)



(d) The student applied a *t*-test to the data she obtained.
She obtained a result of $t = 3.09$ from her calculation.

The table below shows critical values of *t* with 10 degrees of freedom, at different significance levels.

Significance level (p)	0.05	0.01	0.001
Critical value of *t*	2.23	3.17	4.59

What conclusions can be drawn from this investigation?

Use the information provided in the table above and in the graph you have drawn.

(3)

(e) Suggest why it may **not** be reasonable to draw a firm conclusion from the results of this investigation.

(3)

(Total for Question 2 = 14 marks)

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3 A student was completing work experience at a local dental surgery.
He was interested in investigating the extent to which different drinks could affect tooth decay. Many of the patients suffering from tooth decay reported that they regularly drank orange juice for breakfast.
The dentist agreed to help by providing some teeth that had been extracted from a variety of patients.
The student formed the hypothesis that the lower the pH of the drink the faster a tooth will decay.

Plan an investigation to test this hypothesis.

Your answer should give details under the following headings.

(a) A consideration of whether there are any safety or ethical issues you would need to consider.

(3)

(b) Suggestions for preliminary work that you might undertake to ensure your proposed method would provide meaningful data.

(3)

(c) A detailed method that includes the reasons for your choice of apparatus and technique, and how important variables are to be controlled or monitored.

(10)

(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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