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

Thursday 9 November 2017 – Morning
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 ▶

P50785A
©2017 Pearson Education Ltd.
1/1/1/1/

Pearson

Answer ALL questions.

1 The photograph below shows a guava fruit.

This fruit is a good source of vitamin C. Two varieties of guava, Donaldson and Supreme, contain different concentrations of vitamin C.

Magnification ×0.5

(a) The table below shows the vitamin C content of these two varieties.

Variety of guava fruit	Concentration of vitamin C / mg per 100 g of fruit
Donaldson	372
Supreme	44

Using the data in the table, calculate the percentage increase in the vitamin C content of the Donaldson variety compared with the Supreme variety.

Show your working.

(2)

.... %

(b) (i) Describe an experiment to compare the vitamin C content of these two varieties of guava fruit.

(6)

P 5 0 7 8 5 A 0 3 2 0

(ii) State **two** variables, related to the fruit, which could affect this experiment.

(2)

....

....

....

....

(iii) Choose **one** of the variables you have identified in (b)(ii). 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 is controlled.

....

....

....

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

....

....

....

(Total for Question 1 = 12 marks)

BLANK PAGE

2 The photograph below shows three black-tailed godwits.

Magnification ×0.05

These birds live in Iceland and have a lifespan of about 18 years.

Each year, they migrate to the United Kingdom. They start to return to Iceland in April.

Their return to Iceland is getting earlier each year as the climate changes.

For part of one year, a nature reserve in Iceland kept a record of the year of hatching of each black-tailed godwit that arrived each day. These data formed part of an investigation into climate change and the date of the return of the birds.

This record is shown in the table below.

Date	Number of days from the start of the year	Total number of black-tailed godwits arriving each day	Years of hatching
17th April	107	1	2008
18th April	108	0	
19th April	109	1	2002
20th April	110	2	2005 and 2008
21st April	111	2	2005 and 2008
22nd April	112	0	
23rd April	113	3	2002
24th April	114	0	
25th April	115	1	2005
26th April	116	1	2005
27th April	117	0	
28th April	118	2	2002 and 2005
29th April	119	0	
30th April	120	1	1999
1st May	121	2	1996 and 1999
2nd May	122	2	1999 and 2005
3rd May	123	0	
4th May	124	0	

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

(2)

....

....

....

....

(b) Calculate the mean day of return (number of days from the start of the year) for each year of hatching.

Prepare a table to display the **raw data** to show day of return and your calculated **mean** for each year of hatching.

(3)

BLANK PAGE

Question 2 continues on the next page

(c) On the graph paper below, draw a graph to show the mean day of return of birds hatched in each year.

Include an indication of the variability of the data.

(4)
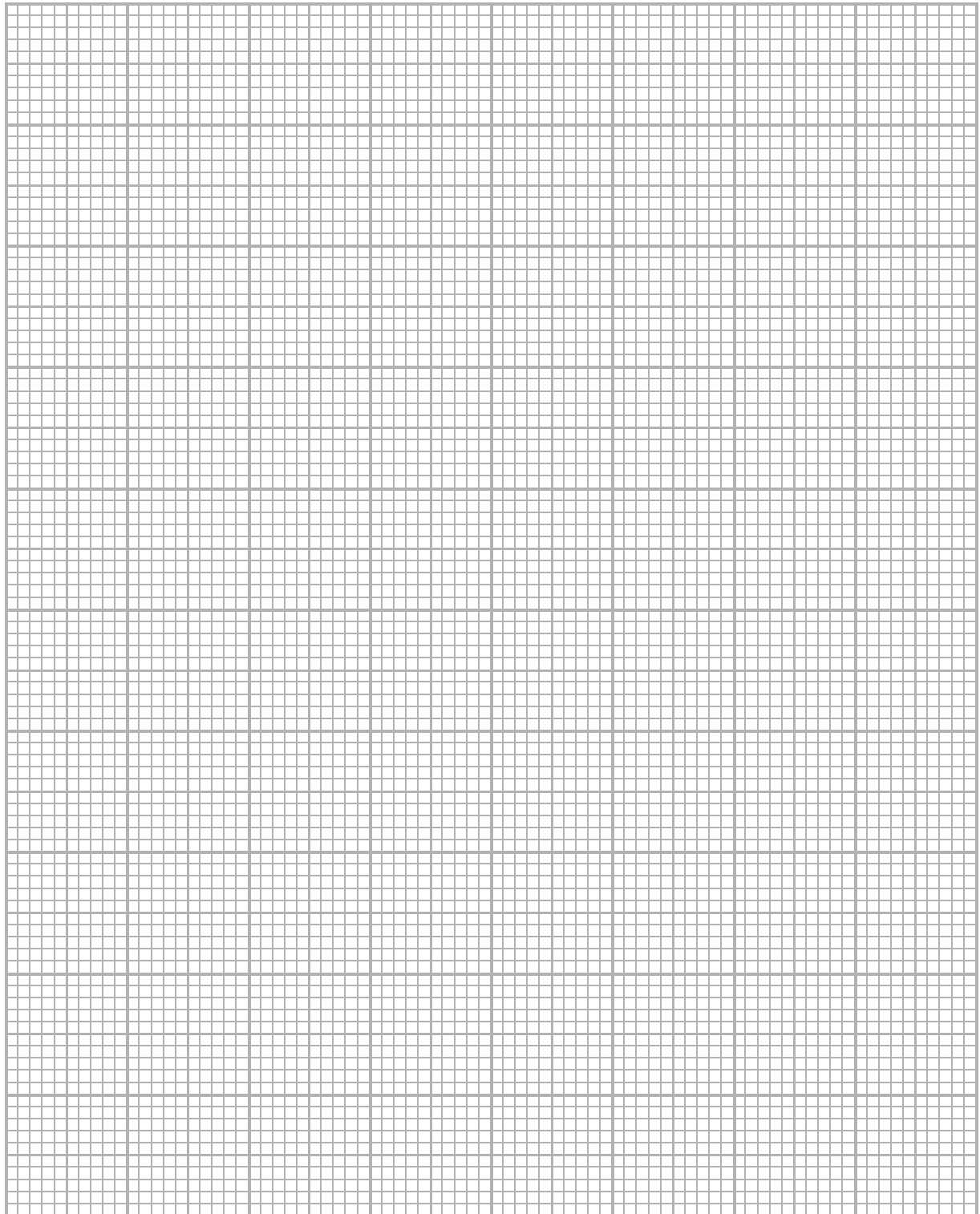
PMT

(d) The correlation coefficient, *r*, was used to test the strength of the relationship between year of hatching of black-tailed godwits and the day of their return to Iceland.

The calculated value of *r* for these results is −0.660.

The table below shows some critical values for *r*.

The number of degrees of freedom is calculated using the formula shown below:

$$\text{degrees of freedom} = n - 2$$

where *n* represents the total number of birds that arrived.

Degrees of freedom	Level of significance		
	0.050	0.010	0.005
1	0.988	0.999	0.999
2	0.900	0.980	0.990
3	0.805	0.934	0.959
4	0.729	0.882	0.917
5	0.669	0.833	0.875
8	0.549	0.715	0.765
12	0.457	0.612	0.661
16	0.400	0.558	0.606
20	0.360	0.492	0.537

What conclusions can be drawn from this investigation?

Use your graph and the information in the table of critical values to explain your answer.

(4)

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

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

(3)

....

....

....

....

....

....

....

....

....

....

....

....

(Total for Question 2 = 16 marks)

3 The photograph below shows *Mercurialis perennis*, a plant found growing in woodland.

Magnification ×1.0

Different light intensities under trees in a woodland may affect the distribution of plants growing on the ground.

A student observed more *M. perennis* plants growing in some parts of a woodland.

The student formed the following hypothesis.

The abundance of *M. perennis* plants increases as light intensity decreases.

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 take into account.

(2)

....

....

....

....

....

....

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

(3)

(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 = 22 marks)

TOTAL FOR PAPER = 50 MARKS

BLANK PAGE

BLANK PAGE