Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	1	0	6	/	0	2	Signature	

Paper Reference(s)

6106/02 W2

Edexcel GCE

Biology

Biology (Human)

Advanced

Unit Test 6 Paper 02 W2

Monday 28 January 2008 – Morning

Time: 1 hour 20 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
Total	

Materials required for examination
Ruler

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown above.
Check that you have the correct question paper.
Answer ALL questions. Write your answers in the spaces provided in this question paper.
Show all the steps in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and parts of questions are shown in round brackets: e.g. **(2)**.
There are 2 questions in this question paper. The total mark for this paper is 32.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly numbered.
You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking account of your use of grammar, punctuation and spelling.

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Answer BOTH questions.

Write your answers in the spaces provided.

1. Dogwhelks (*Nucella lapillus)* are carnivorous snails that live on rocky shores. Barnacles, which are small filter-feeding crustaceans, are their main prey. The barnacles fix themselves permanently to rocks on these shores.

A student formed the hypothesis that the distribution of dogwhelks was determined by the availability of their main food source.

To test this hypothesis, she placed a 1 m^2 quadrat at eight random points at one level along a rocky shore. The number of dogwhelks inside each quadrat was counted.

However, the student decided that, barnacles were small and too numerous to count accurately in such a large area. Therefore, she counted their numbers in five separate 5 cm × 5 cm quadrats placed randomly inside the 1 m^2 quadrat at each of the eight sites.

The results of her investigation are shown below.

Main quadrat 1 m × 1 m	Barnacle counts in 5 cm × 5 cm quadrats
Quadrat 1	Dogwhelks = 14 Barnacle counts = 32, 50, 29, 35, 46
Quadrat 2	Dogwhelks = 6 Barnacle counts = 15, 20, 26, 0, 11
Quadrat 3	Dogwhelks = 9 Barnacle counts = 26, 32, 19, 15, 25
Quadrat 4	Dogwhelks = 1 Barnacle counts = 12, 14, 19, 10, 17
Quadrat 5	Dogwhelks = 12 Barnacle counts = 52, 27, 33, 37, 39
Quadrat 6	Dogwhelks = 4 Barnacle counts = 21, 14, 22, 4, 9
Quadrat 7	Dogwhelks = 10 Barnacle counts = 47, 21, 29, 32, 34
Quadrat 8	Dogwhelks = 9 Barnacle counts = 23, 31, 17, 16, 21

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(a) Use the barnacle counts to estimate the total number of barnacles in each 1 m^2 quadrat. Prepare a table and present the results in a suitable way so the number of dogwhelks and the number of barnacles in each 1 m^2 quadrat can be compared.

(4)

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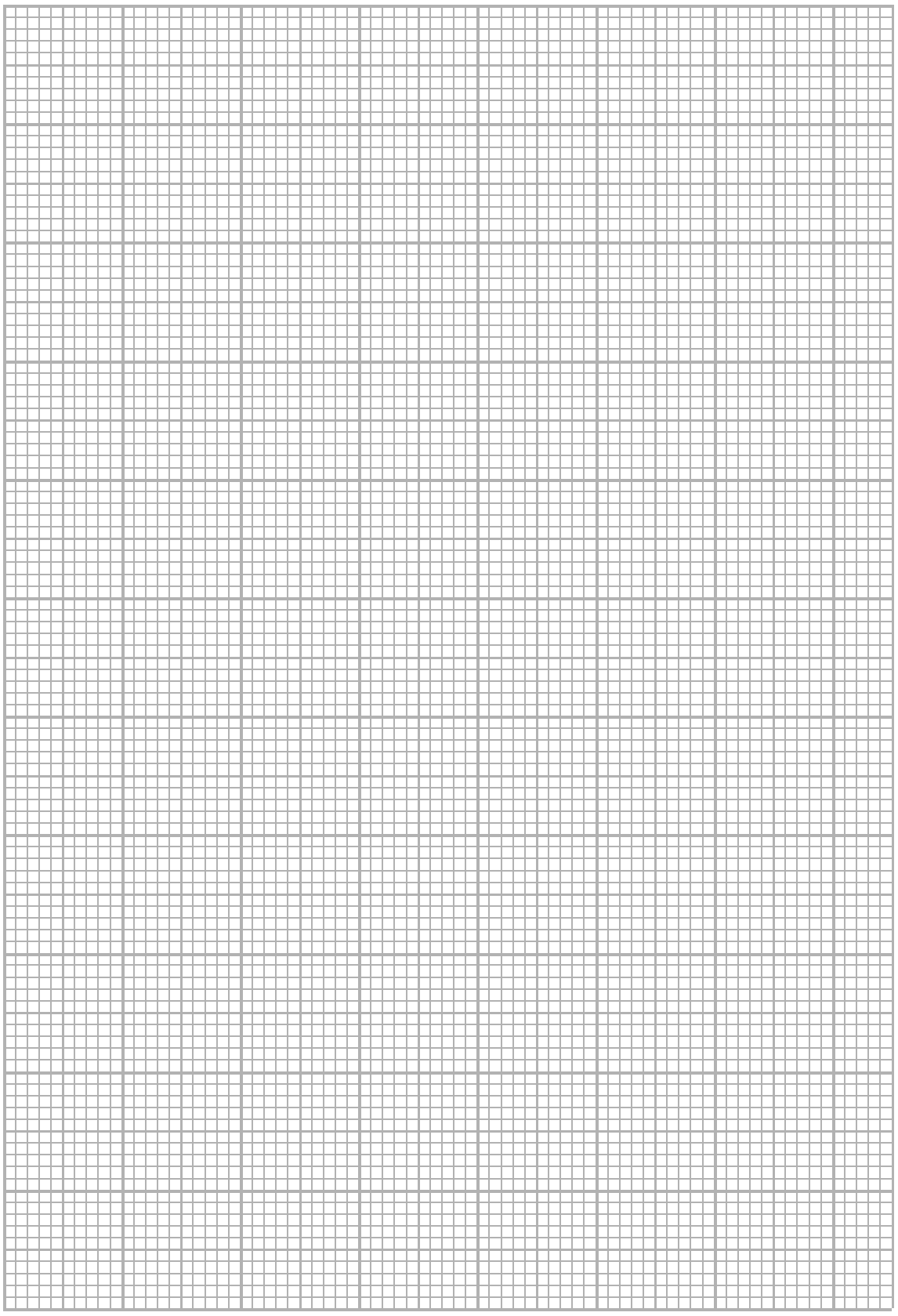
(b) Use the data in your table to present the information in suitable graphical form.



(3)

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(c) To test the relationship between numbers of dogwhelks and barnacles, the student used a rank correlation coefficient.

Calculate the rank correlation coefficient (r_s) for these data using the information given below. Show your working.

$$r_s = 1 - \frac{6\Sigma D^2}{n^3 - n}$$

Where $\Sigma D^2 = 4$

n = the number of samples

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(2)

(d) The critical value of r_s, at p = 0.05, for this investigation is 0.738.

Using your calculated value of r_s, what conclusion concerning the relationship between the number of dogwhelks and number of barnacles can be drawn from this investigation?

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(2)

Q1

(Total 11 marks)

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2. Many plants produce chemicals that inhibit the growth and germination of other plant species. This allows the plants to reduce competition and to grow more vigorously.

Mouse-ear hawkweed (*Hieracium pilosella*) is a flowering plant that grows in meadows and pastures. In these habitats, this plant often competes successfully with grasses, especially those of the *Festuca* species.

Plan an investigation to be carried out in the laboratory to test the hypothesis that the roots of *Hieracium* contain chemicals that inhibit the germination of *Festuca* seeds.

Your answer should give details under the following headings:

(a) Plan of the investigation to be carried out.

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(12)

(b) Recording of raw data measurements, presentation of results and data analysis.

(4)

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(c) Limitations of your proposed method and an indication of further work that could be undertaken.

Limitations .....

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Further work .....

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(5) **Q2**

(Total 21 marks)

TOTAL FOR PAPER: 32 MARKS

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