

6106/02 (W2)**Edexcel GCE****Biology****Biology (Human)****Advanced****Unit 6 Paper 02 (W2)****Tuesday 24 May 2005 – Morning****Time: 1 hour 20 minutes****Materials required for examination**Answer Book (AB08)
Graph Paper (ASG2)
Ruler**Items included with question papers**

Nil

Instructions to Candidates

In the boxes on the answer book provided, write the name of the examining body (Edexcel), your centre number, candidate number, the subject title, the paper reference, your surname, other names and signature.

The paper reference is shown above.

Answer BOTH questions in the answer book.

Show all the steps in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Additional answer sheets may be used.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

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.

Printer's Log. No.

N21433A

N 2 1 4 3 3 A

*Turn over***edexcel**

Answer BOTH questions.

1. Lichens are plant-like organisms that may grow on the surface of tree trunks. After a pilot study of their distribution on trees, a student produced the hypothesis that one type of lichen grew larger on birch trees than on oak trees.

For the main study, the student selected eleven trees of each species. She placed a 50 cm × 50 cm quadrat one metre from the ground on the south facing side of one of them. She then selected the largest lichen of her chosen type inside the quadrat, and measured its width at its widest point.

This technique was repeated for each of the selected trees.

An extract from the student's field record is shown below.

Width of lichens on birch					
55 mm	24 mm	21 mm	18 mm	60 mm	8 mm
35 mm	22 mm	33 mm	16 mm	28 mm	
Width of lichens on oak					
15 mm	20 mm	6 mm	14 mm	16 mm	
33 mm	9 mm	13 mm	19 mm	45 mm	12 mm

- (a) Prepare a table of the raw data and organise it in such a way that the median width of these lichens on each species of tree can be identified. (4)
- (b) Use the data in your table to present the information in a suitable graphical form. (3)
- (c) State a null hypothesis for this investigation. (1)

(d) The student decided to apply the Mann-Whitney U test to the data. This statistical test determines if the difference between the medians is significant.

The calculations produced two U values, $U_1=92$ and $U_2=29$. In order to support her hypothesis, the smaller U value is required to be the same as, or less than, the critical value.

The table below shows the critical values for the Mann-Whitney U test at the $p=0.05$ level.

Sample size n_1	Sample size n_2					
	8	9	10	11	12	13
8	13	15	17	19	22	24
9	15	17	20	23	26	28
10	17	20	23	26	29	33
11	19	23	26	30	33	37
12	22	26	29	33	37	41
13	24	28	33	37	41	45

Use the information above to draw conclusions from this investigation.

(3)

(Total 11 marks)

2. On grasslands where cattle are grazed in large numbers, their dung (faeces) becomes a serious problem as it covers the ground, reducing the area of actively-growing grass. Dung beetles are small insects that remove cattle dung and play an important role in maintaining a balanced ecosystem. The faster the dung can be removed by these beetles, the more grass will become available for cattle to eat.

A farmer is planning to introduce a new species of dung beetle called 'Superpat'. It is claimed that 'Superpat' removes cattle dung at a faster rate than the native dung beetle which is currently found in his fields.

Plan an investigation, which you personally could carry out, to test the hypothesis that 'Superpat' dung beetles will produce a larger area of grass for grazing than native dung beetles.

Your answer should be given under the following headings.

- (a) Plan of the investigation to be carried out. **(10)**
- (b) Recording of raw data measurements, presentation of results and methods of data analysis. **(6)**
- (c) Limitations of your method and an indication of further work that could be undertaken to provide additional evidence for your conclusions. **(5)**

(Total 21 marks)

TOTAL FOR PAPER: 32 MARKS

END