Paper Reference(s)

6106/02 W2

Edexcel GCE

Biology

Biology (Human)

Advanced

Unit Test 6 Paper 02 W2

Tuesday 27 January 2004 – Morning

Time: 1 hour 20 minutes

Materials required for examination	Items included with question papers
Answer Book (AB08) Graph Paper (ASG2) Ruler	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.

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Answer BOTH questions

1. A student noticed that on two fields, one with horses grazing and the other with cattle, differences were apparent between the number of elder seedlings growing in each field.

She thought that there were more elder seedlings growing in the field grazed by horses than in the field grazed by cattle.

To test this hypothesis, she counted the numbers of elder seedlings at 20 random sites in each field using a 0.25 m^2 quadrat.

A record of her field studies is shown below.

Numbers of elder seedlings in areas of 0.25 m^2 where horses graze

18	12	16	22	8	9	21	4	17	5
9	15	17	23	13	14	10	14	14	16

Numbers of elder seedlings in areas of 0.25 m^2 where cattle graze

10	8	8	3	4	6	9	18	1	14
8	5	10	2	12	13	7	17	9	11

(a) Organise these data into two tally charts, one for each field. Group the data into suitable size classes to enable you to compare the numbers of seedlings in each field.

(4)

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

(3)

(c) State a suitable null hypothesis for this investigation.

(1)

(d) In order to determine if her data supported her hypothesis, the student applied a *t*-test. This statistical test determines whether the difference between two means is significant. A *t*-value of 3.71 was calculated.

The table below shows critical values for *t* with 38 degrees of freedom for various significance levels.

Significance level %	20	10	5	2	1
Critical value of *t*	1.30	1.68	2.02	2.42	2.70

What conclusions can be drawn from this investigation? Use the information provided to explain your answer.

(3)

(Total 11 marks)

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2. Potatoes are one of the major sources of carbohydrate worldwide. However, they can be affected by many diseases that seriously reduce productivity.

The leaves of potato plants may be affected by a virus that causes the leaves to curl, which reduces the surface area of the leaves exposed to sunlight. The virus is passed from plant to plant by insects called aphids.

Modern techniques have made it possible to produce potatoes, called *marvel*, that show increased resistance to this virus compared to the unaltered type, called *native*.

A student was asked to carry out an investigation, in a laboratory or a glasshouse, to test the hypothesis that *marvel* potato plants have greater viral resistance than *native* plants.

Plan an investigation, which you could personally carry out, to test this hypothesis.

Your answer should give details under the following headings.

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

(12)

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

(4)

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

(5)

(Total 21 marks)

TOTAL FOR PAPER: 32 MARKS

END