Centre No.					Pape	er Refer	ence			Surname	Initial(s)
Candidate No.			6	1	0	6	/	0	3	Signature	

6106/03

Edexcel GCE

Biology

Biology (Human)

Advanced

Unit Test 6 Paper 03 Synoptic Paper Wednesday 28 January 2009 – Afternoon Time: 1 hour 10 minutes

Materials required for examination	Items included with question paper
Ruler	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 Questions 1 and 2 and then either Question 3 or either 4B or 5H in the spaces provided in this question paper.

Indicate which question you are answering by marking the box with a cross (X). If you change your mind, put a line through the box (\mathbb{H}) and then indicate your new question with a cross (\mathbb{H}) . 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). The total mark for this paper is 38.

Advice to Candidates

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. This question paper is designed to give you the opportunity to make connections between different areas of biology and to use skills and ideas developed throughout the course in new contexts. You should include in your answers any relevant information from the whole of your course.

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Examiner's use only Team Leader's use only

1 3 4B 5H

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Answer Questions 1 and 2 in the spaces provided.

1. ((a)	Explain	what is	meant by	each of the	following terms.
,	(u)	Lapium	Wilat ID	illealle o y	cach of the	TOTIO WILL COLLIES.

Action potential
(2)
Transmitter substance
(2)

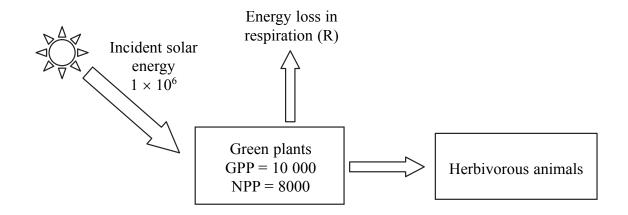
(b) The table below shows the relationship between the diameter of a number of myelinated axons and the conduction velocity (speed of conduction of the nerve impulse).

Diameter of axon / μm	Conduction velocity / m sec-1
2	15
4	21
6	38
8	45
10	60
12	75
14	82

	Describe the relationship between axon diameter and the conduction velocity.	l t
	(2)	
(c)	Ouabain is a substance which is present in the seeds of certain plants. Ouabain has been shown to be an inhibitor of the ATPase enzyme associated with the sodium-potassium pump in the cell surface membrane.	
	Suggest what effect ouabain would have on the conduction of nerve impulses. Give an explanation for your answer.	
		- 1
	(3)	Q

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2. (a) The diagram below shows energy flow in part of a terrestrial ecosystem. All figures are in $kJ\ m^{-2}\ yr^{-1}$.



(i)	Explain why not all the incident light energy falling on a green plant is used by the plant for gross primary production (GPP).

(ii) Calculate the energy loss in respiration (R) by green plants.

Answer	
	(1)

(iii) Calculate the percentage of the incident solar energy that becomes incorporated into the net primary production (NPP). Show your working.

Answer	(%

(2)

(b) Locusts are herbivorous insects that can cause enormous losses to growing crops. Adult female locusts lay eggs which hatch into 'hoppers'.



A locust hopper Magnification ×3

An investigation was carried out to study the effects of feeding either maltose or glucose on the growth of locust hoppers. Groups of hoppers were fed on a diet containing equivalent concentrations of the two carbohydrates.

The results are shown in the table below.

Davis after hetaking	Mean mass of	f hoppers / mg
Days after hatching	Diet containing maltose	Diet containing glucose
0	25	25
6	70	65
12	250	240
18	560	450

(i)	Compare the growth of hoppers when fed on these two carbohydrates.
	(2)

	(2)
loca	opesticides are a type of biological control mechanism. It is possible to control usts using a biopesticide made from a naturally-occurring fungus (<i>Metarhizium</i> sp.) ich infects locusts. This fungus can be mixed with a liquid and sprayed onto large as. Once infected with the fungus, locusts die within four to ten days.
	ggest advantages of using biopesticides, rather than chemical insecticides, for the trol of locusts.
	(4)
	(4) (Total 14 marks)

Leave blank Write an essay on ONE of the following topics. For Biology you should choose EITHER Question 3 OR Question 4B. 3. Nucleic acids and the effects of point mutations. **(15 marks) 4B.** The transport and roles of water in flowering plants. (15 marks) For Biology (Human) you should choose EITHER Question 3 OR Question 5H. Nucleic acids and the effects of point mutations. (15 marks) **5H.** The growth of human populations and the causes and effects of desertification. **(15 marks)** Marks will be awarded for scientific content, coverage of the topic, and the quality of written communication. You should include in your answer any relevant information from the whole of your course. You may include diagrams if you wish, but make sure that they are relevant to your essay and add extra information to it. Indicate which question you have chosen by marking the box (\boxtimes). If you change your mind, put a line through the box (\boxtimes) and then indicate your new question with a cross (\boxtimes) . Chosen question number: **Question 3** X Question 4B Question 5H Write your answer, including any plan, here.



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 (Total 15 marks)
TOTAL FOR PAPER: 38 MARKS



