Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	1	0	6	/	0	3	Signature	

Paper Reference(s)

6106/03

Edexcel GCE

Biology

Biology (Human)

Advanced

Unit Test 6 Paper 03 Synoptic Paper

Wednesday 18 June 2008 – Afternoon

Time: 1 hour 10 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4B	
5H	
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 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 (☒). If you change your mind, put a line through the box (☒) and then indicate your new question with a cross (☒).
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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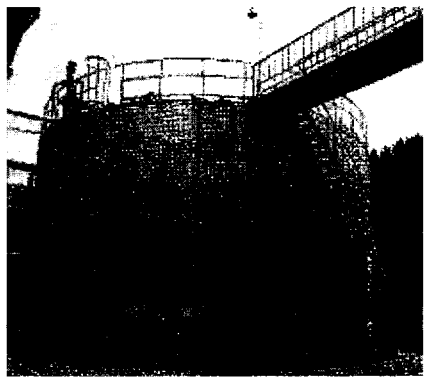
Answer Questions 1 and 2 in the spaces provided.

1. Biogas is an example of a fuel obtained from domestic and agricultural organic waste materials. Biogas is produced in a digester.



A biogas digester

(a) Name the **two** principal components of biogas.

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(1)

(b) The table below shows the changes in pH in a biogas digester, recorded over a period of 30 days. On day 0, the digester was filled with fresh organic material.

Time / days	pH
0	7.0
5	6.2
10	5.5
15	5.6
20	5.8
25	6.0
30	6.5

(i) Describe the changes in pH, as shown in the table.

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(2)

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(ii) Suggest explanations for the changes in pH during the following intervals.

Day 0 to day 10

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Day 10 to day 30

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(3)

(c) Suggest why it is important to prevent ions of heavy metals, such as mercury, from getting into a biogas digester.

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(2)

Q1

(Total 8 marks)

Leave blank

2. (a) Explain what is meant by each of the following terms.

(i) Allele

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(2)

(ii) Phenotype

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(2)

(b) Manx cats have no tails and have the genotype **Mm**. Cats with normal tails have the genotype **mm**. The genotype **MM** is an example of a lethal genotype and the embryo with this genotype does not develop.

In the space below, draw a genetic diagram to find the **probability** that a kitten produced by crossing two Manx cats will have a normal tail.

(3)

Leave blank

(c) Siamese cats have light-coloured fur, but with dark-coloured faces, ears, tails and paws. This is due to a temperature-sensitive mutation. As a result of this mutation, the enzyme responsible for the production of the pigment is easily denatured.

A Siamese cat

Suggest an explanation for the distribution of dark-coloured fur in a Siamese cat.

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(3)

QUESTION 2 CONTINUES ON THE NEXT PAGE

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(d) Albino cats lack the pigment melanin and have white fur. Melanin is synthesised from the amino acid tyrosine and involves the enzyme tyrosinase, as shown in the metabolic pathway below.

(i) Explain what is meant by the term **metabolic pathway**.

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(2)

(ii) Suggest how a point mutation in the gene for the production of the enzyme tyrosinase could result in an albino cat.

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(3)

Q2

(Total 15 marks)

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Write an essay on ONE of the following topics.

For Biology you should choose EITHER Question 3 OR Question 4B.

3. Energy flow and succession in ecosystems.

(15 marks)

4B. Sexual reproduction and genetic variation in flowering plants.

(15 marks)

For Biology (Human) you should choose EITHER Question 3 OR Question 5H.

3. Energy flow and succession in ecosystems.

(15 marks)

5H. The structure of proteins, and how proteins provide evidence for human evolution.

(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 (☒). If you change your mind, put a line through the box (~~☒~~) and then indicate your new question with a cross (☒).

Chosen question number: **Question 3** ☒

Question 4B ☒

Question 5H ☒

Write your answer, including any plan, here.

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(Total 15 marks)

TOTAL FOR PAPER: 38 MARKS

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