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

Paper Reference(s)

6136/01

Edexcel GCE

Biology (Salters-Nuffield)

Advanced

Unit Test 6 Synoptic Paper

Wednesday 18 June 2008 – Afternoon

Time: 2 hours

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
Total	

Materials required for examination
Nil

Items included with question papers
A copy of the scientific article taken from *A Short History of Nearly Everything* by Bill Bryson

Data booklet for Question 2

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 THREE questions. You must answer Questions 1 and 2, and then EITHER Question 3 OR Question 4. You should allow about 45 minutes for answering Question 3 or 4 including planning time.
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 (☒).
Write your answers in the spaces provided in this question paper.

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 60.
There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, including your use of grammar, punctuation and spelling.

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Answer BOTH questions 1 and 2

1. The scientific article you have studied is an extract from a book called *A Short History of Nearly Everything* by Bill Bryson. Use the information from the article, and your own knowledge, to answer the following questions.

(a) With reference to evidence in the article, explain why it can be argued that bacteria represent the most dominant group of organisms in the world.

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(4)

(b) (i) Outline the principles underlying Woese's three domain system of taxonomy: Bacteria, Archaea and Eukarya.

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(ii) Suggest why the three domain system proposed by Woese has not been adopted by all biologists.

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(c) Give **two** key differences between prokaryotic and eukaryotic cells.

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(d) Explain what Margulis and Sagan meant by 'all bacteria swim in a single gene pool'.

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(e) Explain why it is often your immune system that makes you ‘feel wretched’ rather than the disease.

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(f) Explain why methicillin-resistant staphylococcus aureus (MRSA) has developed so quickly.

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(g) Suggest why the *Ebola* virus has not yet caused a global epidemic.

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(1)

Q1

(Total 20 marks)

Leave blank

2. Read and use the data in the data booklet provided, and your own knowledge, to answer the following questions.

(a) (i) Construct an appropriate food web diagram to show the feeding relationships between the organisms referred to in the data booklet and which shows the trophic levels each organism occupies.

(3)

(ii) Explain why the total biomass of cod in the North Sea is normally much less than the total biomass of sand eels.

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(b) (i) Suggest **two** advantages to the phytoplankton of being concentrated just below the sea surface (Figures 1 and 4).

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(ii) Like land plants, phytoplankton require mineral salts. Suggest why phosphates are essential for the growth of phytoplankton.

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(1)

(c) (i) In Figure 4, the units used to express primary productivity are abbreviated as $g\,Cm^{-2}$. Given that 'C' stands for organic carbon and the other letters are common metric units, suggest what $g\,Cm^{-2}$ stands for by writing it out in full.

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(1)

(ii) With reference to Figures 4 and 5, discuss the extent to which mean sea surface temperature controls the primary productivity of phytoplankton.

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(iii) Measurements show that the mean light intensity for the months May and July is the same, but the mean sea surface temperature is 8 °C higher in July than in May. Suggest why, in spite of this, primary productivity is similar in these two months.

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(d) The numbers of *Calanus* in the North Sea have been decreasing since 1960 and there is some evidence that this may be due to climate change. The distribution of *Calanus finmarchicus*, one of the most abundant species, seems to be shifting northwards, becoming more common off the coast of Norway. Suggest why *Calanus* may not succeed so well in warmer water.

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(e) (i) There are several reasons why commercially important stocks of fish, such as cod and herring, are under threat in the North Sea. Using information in Figure 6 explain why over-fishing by humans is almost certainly part of the problem.

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(ii) Nets used by fishermen in the North Sea are required to have a mesh size which catches larger fish but allows the smaller (younger) fish to escape. This acts as a selection pressure on the cod population. Explain the effects this selection pressure might have on the phenotypes of these cod in future generations.

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Q2

(Total 20 marks)

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Answer ONE of the following essay questions.

You should choose EITHER Question 3 OR Question 4.

You are expected to answer in continuous prose. You should use examples from the biology course you have studied but need not restrict yourself to the course content.

You are advised to spend approximately 45 minutes answering Question 3 or Question 4, including planning time.

Marks will be awarded in the following areas:

Breadth: selecting a range of aspects of biology from different parts of your AS and A2 course which are relevant to the question. **(up to 6 marks)**

Depth: developing the aspects you have chosen by including relevant details, examples and discussion. **(up to 8 marks)**

Balance: have you answered the question asked? for example, by dealing with the bigger ideas which lie beneath the wording of the question, such as discussing implications, weighing up benefits and risks, advantages and disadvantages or the extent to which an assertion in the question is or is not valid. **(up to 6 marks)**

Style: coherence, clarity and expression; for example, good use of technical terms, sentences and paragraphs, and weaving together information and ideas clearly to focus on the question. **(up to 4 marks)**

3. Our ability to detect and respond to changes in our external and internal environment has enabled humans to survive on all continents and in a wide variety of potentially hazardous situations.

Write an essay on: **'The importance of control and coordination in the body.'**

(Total 20 marks)

OR

4. Begun formally in 1990, the Human Genome Project was a 13-year effort designed to identify all of the approximately 20,000–25,000 genes in human DNA and determine the sequence of the 3 billion base pairs that make up human DNA. As this knowledge grows not only does the scope of what might be achieved increase but also the concerns about where it will all lead.

Write an essay on: **'The applications and implications of our increasing knowledge of human DNA.'**

(Total 20 marks)

Leave blank

Indicate which question you are answering by marking the box (☒). If you change your mind about which question to answer, put a line through the box (~~☒~~) and then indicate your new question with a cross (☒).

Chosen question number: **Question 3** ☐ **Question 4** ☐

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Q3 or Q4

(Total 20 marks)

TOTAL FOR PAPER: 60 MARKS

END