

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
TWENTY FIRST CENTURY SCIENCE  
BIOLOGY A**

**A223/01**

Unit 3 Ideas in Context plus B7 (Foundation Tier)

**WEDNESDAY 21 MAY 2008**

Afternoon  
Time: 60 minutes

Candidates answer on the question paper.

**Additional materials (enclosed):**

Insert

Calculators may be used.

**Additional materials:** Pencil  
Ruler (cm/mm)



Candidate  
Forename

Candidate  
Surname

Centre  
Number

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Candidate  
Number

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**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

**INFORMATION FOR CANDIDATES**

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 55.
-  Where you see this icon you will be awarded a mark for the quality of written communication in your answer.

**FOR EXAMINER'S USE**

Qu.	Max.	Mark
1	13	
2	10	
3	13	
4	10	
5	9	
<b>TOTAL</b>	<b>55</b>	

This document consists of **13** printed pages, **3** blank pages and an insert.

Answer **all** the questions.

**1 This question is based on the article about deadly pathogens.**

**(a)** The article refers to pathogens and hosts.

The tuberculosis bacterium is a **pathogen** and a human is its **host**.

Suggest what is meant by the words:

**(i)** pathogen

.....  
..... [1]

**(ii)** host

.....  
..... [1]

**(b)** Scientists used to think that pathogens always evolved to become less deadly.

Explain why this is an advantage to the pathogen.

.....  
.....  
..... [2]

**(c)** The article suggests that the most deadly pathogens can survive for the longest time outside the body.

**(i)** Write down which pathogen in the table can survive for the longest time outside the body.

..... [1]

**(ii)** Write down the names of **two** pathogens, in the table, that do **not** support this suggestion.

1 .....  
2 ..... [2]

- (iii) Some scientists believe that the time a pathogen survives outside the human body has nothing to do with how deadly the pathogen becomes.

What is their explanation for how deadly a pathogen becomes?

.....  
.....  
.....  
..... [2]

- (d) Explain what scientists have to do to get their theories accepted as scientific knowledge.

.....  
..... [2]

- (e) People can be protected from pathogens by vaccination.

When new vaccines are used, some people are concerned about side-effects from the vaccine.

Explain what is meant by a **side-effect**.

.....  
..... [2]

[Total: 13]

2 Steve is a gardener. He grows some plants.



(a) (i) Steve's plants use photosynthesis to produce glucose.

Complete the **word equation** for photosynthesis.

water + ..... → glucose + ..... [2]

(ii) What is the source of energy for this process?

..... [1]

(b) Glucose is produced by photosynthesis.

Steve writes down **three** things that his plants will do with the glucose.

- 1 use some glucose for respiration
- 2 change some glucose into starch
- 3 change some glucose into other chemicals

Explain why plants do these three things.

use some glucose for respiration .....  
.....  
change some glucose into starch .....  
.....  
change some glucose into other chemicals .....  
..... [3]

(c) Steve knows that dim light limits the rate of photosynthesis in his plants.

(i) Explain what is meant by **limits the rate of photosynthesis**.  
.....  
.....  
..... [1]

(ii) How could Steve prevent dim light limiting photosynthesis in his plants?  
.....  
..... [1]

(iii) Dim light is not the only limiting factor for photosynthesis.

What **two** other things could Steve do to increase the rate of photosynthesis in his plants?

Choose from this list.

- increase the temperature
- increase the oxygen concentration
- give the plants more glucose
- increase the carbon dioxide concentration
- reduce the amount of water

1 .....

2 ..... [2]

[Total: 10]

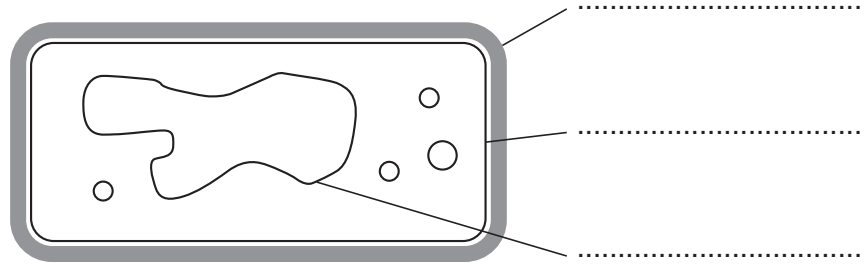
**7**  
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**Question 3 begins on page 8.**

**PLEASE DO NOT WRITE ON THIS PAGE**

3 Bacteria can be genetically modified to produce human insulin.

(a) Label the diagram of a **bacterium**.



[3]

(b) Explain how bacteria can be genetically modified to produce human insulin.

Use these words in your answer.

**isolate      replicate      transfer**



One mark is for a clear and ordered answer.

.....

.....

.....

.....

.....

.....

.....

..... [3+1]



(c) A type of wheat has been genetically modified to be resistant to weed killer. This wheat is now grown in farmers' fields.

Look at the statements about **economic**, **social** and **ethical** implications of genetic modification of crops.

- It is morally wrong to alter the DNA of living things.
- All living things contain DNA.
- Farmers make more profit from their crops.
- People have the right to decide if genetically modified organisms should be released into the environment.

Write down **one** statement that is an example of each of these types of implications.

economic .....

.....

.....

social .....

.....

.....

ethical .....

.....

..... [3]

(d) Other than insulin, name **three** products that can be produced by genetically modified bacteria.

- 1 .....
- 2 .....
- 3 ..... [3]

[Total: 13]

4 Vertebrates have an internal skeleton for support and movement.

(a) Complete the description of the skeleton.

Use words from this list.

**bones cartilage ligaments muscles tendons**

The skeleton gives the body support by having hard .....

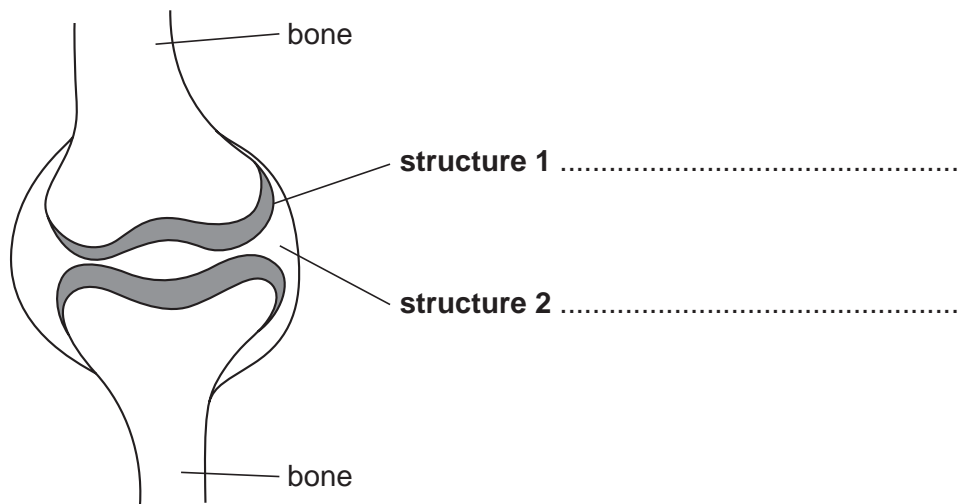
The joints are held together by .....

The skeleton is moved by the contraction of ..... which are attached to the bones by .....

[4]

(b) Bones are held together at joints.

(i) Complete the labelling of the diagram of a joint.



[2]

(ii) Explain the job of **structure 2**.

.....  
..... [2]

(c) Athletes often suffer from sprains.

Describe the **symptoms** and basic **treatment** for a sprain.

symptoms .....

..... [1]

treatment .....

..... [1]

[Total: 10]

5 Animals feed in many different ways.

Read the following article about how some animals feed.

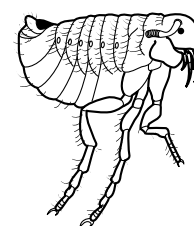
**What's on the menu?**

The clownfish lives close to the stinging tentacles of the sea anemone. The clownfish protects the sea anemone from other fish that want to eat the anemone. In return, the stinging tentacles of the anemone protect the clownfish from other fish. This means that the clownfish and the anemone both benefit from each other.



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Fleas feed by piercing the body of another animal, such as a human, and sucking their blood. This might be good for the flea but it does not do the human much good.



(a) Use the article to give **one** example of each of the following.

(i) a host ..... [1]

(ii) a parasite ..... [1]

(b) (i) Other than the example given above, name **one other** parasite.

name of parasite ..... [1]

(ii) Describe how **two** different features of this parasite enable it to be successful.

feature 1 ..... [1]  
 .....

feature 2 ..... [1]  
 .....

(c) The evolution of a parasite is thought to be closely linked to the evolution of its host.

Which **two** of the statements, **A**, **B**, **C**, **D** or **E**, best explain why?

- A** The host will evolve no matter what happens to the parasite.
- B** The parasite must evolve to cope with any new defence mechanisms that evolve in the host.
- C** Neither the host nor the parasite will evolve.
- D** The host must evolve to produce a new defence mechanism to cope with any new attack mechanisms that evolve in the parasite.
- E** The parasite will evolve no matter what happens to the host.

answers ..... and ..... [2]

(d) Select **two** ways in which the action of parasites affects humans.

Choose from this list.

- increases life expectancy of humans
- reduces levels of carbon dioxide
- causes disease in humans
- reduces food production
- increases fertility

.....  
..... [2]

[Total: 9]

**END OF QUESTION PAPER**

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