

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

**A223/01**

Unit 3: Ideas in Context plus B7 (Foundation Tier)

**Wednesday 15 June 2011  
Morning**

**Duration: 1 hour**

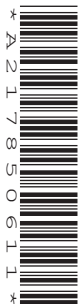
Candidates answer on the question paper.  
A calculator may be used for this paper.

**OCR supplied materials:**

- Insert (inserted)

**Other materials required:**

- Pencil
- Ruler (cm/mm)




Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- The insert will be found in the centre of this document.
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

- The number of marks 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.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

**1 This question is based on the article ‘Anti-wrinkle cream causes stampede at shops’.**

Use the information in the article to answer this question.

**(a)** In **Part A**, what two pieces of **scientific** evidence are given to show that the anti-wrinkle cream worked?

1 .....

2 ..... [2]

**(b)** The anti-wrinkle cream contains different substances.

Name **two** of these substances.

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

**(c)** Look at the pictures of the eyes in the article.

Suggest **two** reasons why the pictures alone can **not prove** whether the anti-wrinkle cream works.

1 .....

2 ..... [2]

**(d)** The research was funded by the manufacturer of the anti-wrinkle cream.

Suggest how this could have affected the findings of the research.

.....

.....

..... [2]

**(e)** What **two** things in **Part B** of the article suggest that the research was carried out properly?

.....

.....

..... [2]

(f) Read **Part C** of the article.

(i) **Wendy** misunderstands the results of the trial.

It was 70% of the people who took part in the trial who showed improvement.

What percentage of the people who took part in the trial did **not** show any improvement?

answer ..... [1]

(ii) Suggest why **Sue** may have wasted her money.

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

(g) Use the article to suggest the best ways of preventing the skin from getting wrinkles.

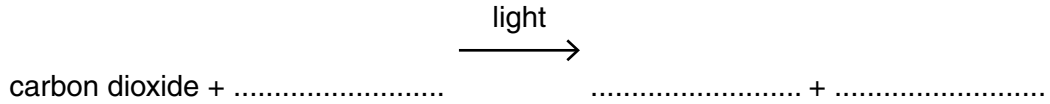
.....  
.....  
..... [2]

[Total: 13]

2 Scientists are concerned about the effects of global warming.  
One cause of global warming is increasing levels of carbon dioxide in the atmosphere.

(a) Photosynthesis removes carbon dioxide from the atmosphere.

Complete the equation for photosynthesis.



[2]

(b) Light energy is used during photosynthesis.

Put ticks (✓) in the boxes next to the **two** correct statements.

Light energy is ...

... absorbed by chlorophyll.

... used to rearrange atoms in water.

... used to rearrange the atoms in mineral salts.

... used to rearrange atoms in chlorophyll.

... absorbed by carbon dioxide.

[2]

(c) The rate of photosynthesis can be limited by low levels of different factors.

State **three** factors that can limit the rate of photosynthesis.

limiting factor 1 .....

limiting factor 2 .....

limiting factor 3 .....

[3]

(d) Most scientists agree that human activity is causing an increased level of atmospheric carbon dioxide.

Describe **two** ways that human activity is increasing carbon dioxide levels.

.....

.....

..... [2]

[Total: 9]

3 DNA technology is used for genetic modification and genetic testing.

(a) Scientists have produced genetically modified sweet corn.



Some people think that changing any organism's genes is wrong.

Which type of implication are these people worried about?

Put a tick (✓) in the box next to the correct answer.

- economic implication
- social implication
- ethical implication

[1]

(b) DNA technology is also used for genetic testing of human blood samples.

Explain how genetic testing of human blood samples is carried out.

Use ideas about

- which blood cells the DNA is extracted from
- what is added to the DNA
- how the genes are identified.

.....

.....

.....

.....

[3]

[Total: 4]

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**PLEASE DO NOT WRITE ON THIS PAGE**

4 Jessica is training for the London Olympics.



(a) (i) When exercising, Jessica’s muscles need a faster supply of oxygen and glucose.

Describe **two** ways in which her body meets these needs.

1 .....

2 .....

[2]

(ii) Explain what will happen to Jessica’s muscles when they are provided with energy from respiration.

..... [1]

(b) Jessica measures her highest blood pressure during training. She compares this figure with other athletes when they train.

Complete these sentences.

Jessica’s highest blood pressure reading is different on **different days** because

.....  
.....

Jessica’s highest blood pressure reading is different from **other athletes** because

.....  
.....

[2]

(c) When Jessica exercises, anaerobic respiration may take place in her muscles.

Complete the word equation for anaerobic respiration.

glucose → ..... + ..... [2]

[Total: 7]

5 Nearly all organisms are ultimately dependent on a single source for their energy.

(a) Put a **ring** around the correct ultimate source of energy for nearly all living organisms.

**the Moon    other animals    the sea    the Sun    other plants**

[1]

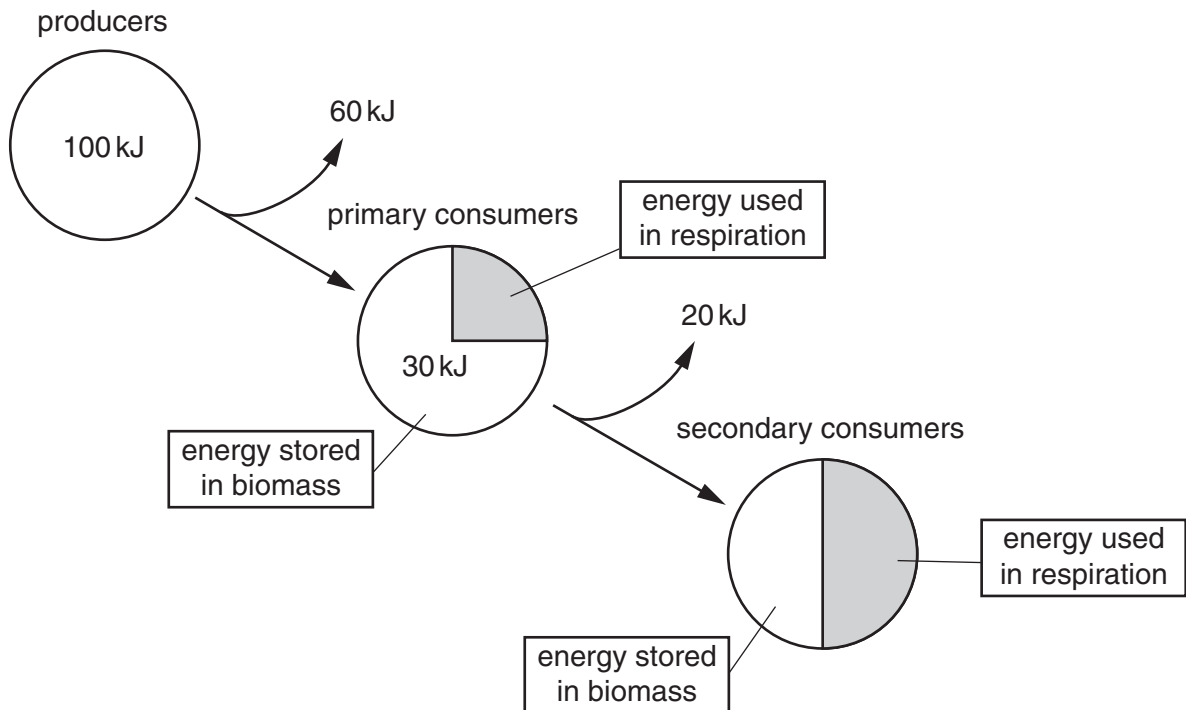
(b) In an ecosystem both autotrophs and heterotrophs are found.

Explain how an **autotroph** is different from a heterotroph.

.....

..... [2]

(c) The pie charts show how 100 kJ of energy is transferred through a food chain.





- (i) What percentage of the energy in the producers is used in respiration in the primary consumers?

Show your working.

answer = ..... % [2]

- (ii) Energy is transferred from the producers to the biomass of the secondary consumers.

What is the energy efficiency of this transfer?

answer = ..... % [1]

- (d) Describe ways in which energy is lost from a food chain.



One mark is for correct spelling, punctuation and grammar.

.....

.....

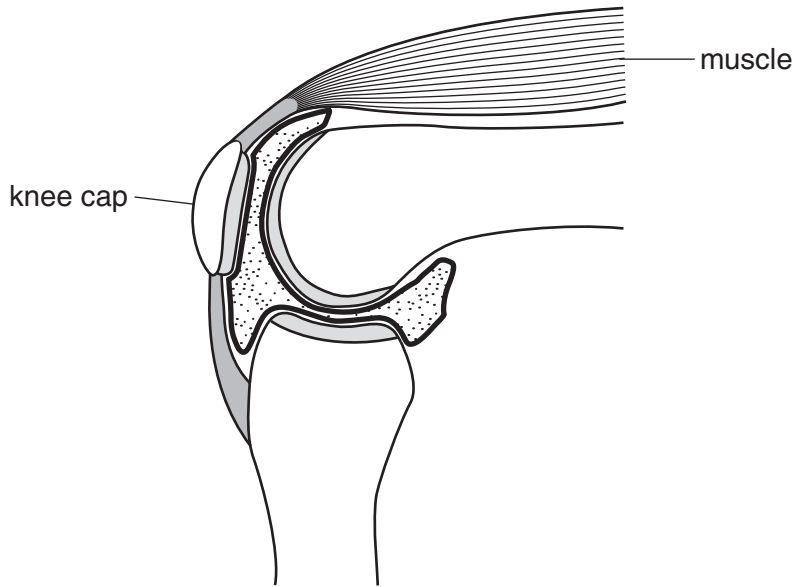
.....

..... [3+1]

[Total: 10]

6 Stan plays rugby. He damages the cartilage in his knee.

The joint swells as extra synovial fluid is produced.



- (a) Complete the diagram by adding labels to show Stan's
  - cartilage
  - synovial fluid.

[2]

(b) Stan sees a doctor in the Accident and Emergency department of a hospital.

The doctor records all of Stan's details on a form.

Explain why it is important that the doctor accurately **records** Stan's details.

.....

.....

..... [2]

(c) Stan has an operation on his knee.

He then receives treatment from a physiotherapist.

Describe a programme of treatment that the physiotherapist could suggest.

.....

.....

..... [2]

[Total: 6]

7 Rebecca donates blood.



(a) Her blood contains the components listed in the table.

Complete the table to describe the **function** of each **component**.

component	function
red blood cells	
white blood cells	
platelets	

[3]

(b) Rebecca is told that she is **blood group B**.

Complete the sentences about Rebecca's blood.

Choose letters from this list.

**A      B      O**

Rebecca's plasma contains ..... antibodies.

Her red blood cells have ..... antigens on their surface.

[2]

(c) The blood that Rebecca donates will be given to a patient.

Explain what will happen if the patient is **not** a suitable match.

.....

..... [1]

[Total: 6]

**END OF QUESTION PAPER**

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