

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

**A223/02**

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

**Wednesday 16 June 2010  
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	
--------------------	--	-------------------	--

Centre Number						Candidate Number				
---------------	--	--	--	--	--	------------------	--	--	--	--

**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

**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 ‘World’s common birds are declining’.**

**(a)** The article is about reducing biodiversity.

**(i)** Explain what is meant by **reducing biodiversity**.



One mark is for a clear, ordered answer.

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

**(ii)** Explain the importance of maintaining biodiversity.

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

**(b)** Red kites were once said to be extinct in England.

They have now been reintroduced and are thriving.

Explain why this use of the word ‘extinct’ was misleading.

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

**(c)** The white-rumped vulture is in danger of extinction.

Explain how scientists could find out if diclofenac was killing the vultures.

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

(d) The populations of common birds in Europe are falling.

Explain why it is not possible to tell from the article whether the fall in numbers has been happening over the full 26 years of the study or is more recent.

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

(e) A spokesperson said that data from various surveys showed a **trend** of a reduction in biodiversity.

Explain why it is necessary to use data from various surveys to show a trend.

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

(f) Studying migratory birds in their summer nesting sites may not provide enough data to explain why their numbers are falling.

Suggest two reasons why.

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

(g) Diclofenac does not kill cattle.

Use your knowledge of pyramids of biomass to suggest why diclofenac may kill vultures.

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

[Total: 13]

2 Plants use energy from the Sun for growth.

Explain how energy from the Sun becomes available for plant growth.

.....

.....

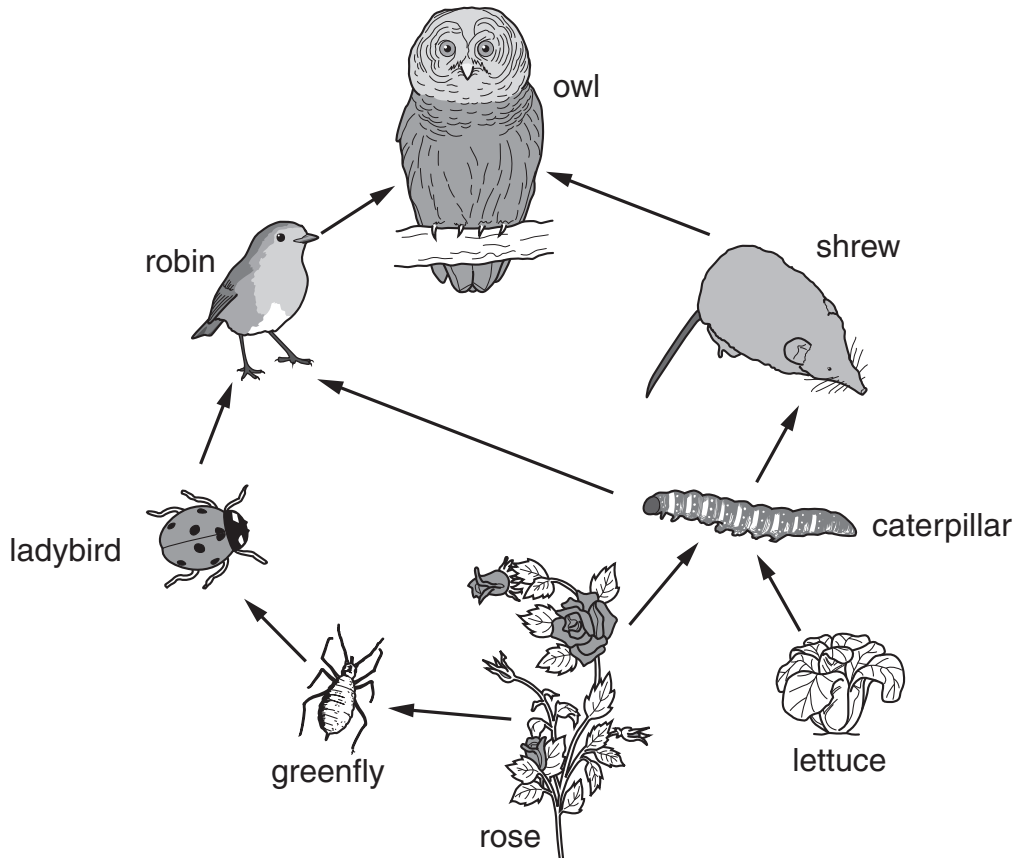
.....

..... [2]

[Total: 2]

3 Look at the food web.

The food web shows a number of food chains.



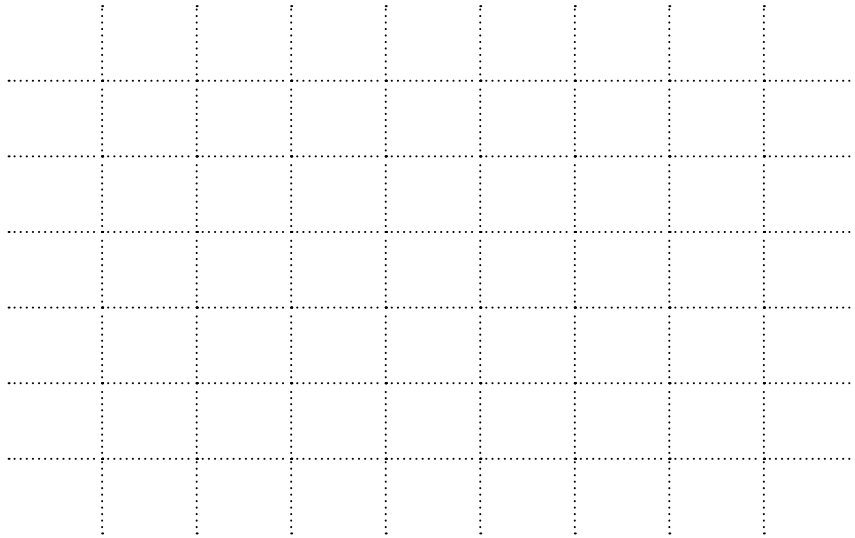
(a) Write down one food chain shown in the food web.

.....

Sketch a pyramid of biomass of **this food chain**.

Label each part of your pyramid.

Use the pre-drawn lines to help you draw the pyramid.



[4]

(b) Explain the advantages of using a pyramid of biomass compared to a pyramid of numbers.

.....

.....

..... [2]

[Total: 6]

4 Plants store food as starch.

(a) Explain why plants store food as starch rather than glucose.

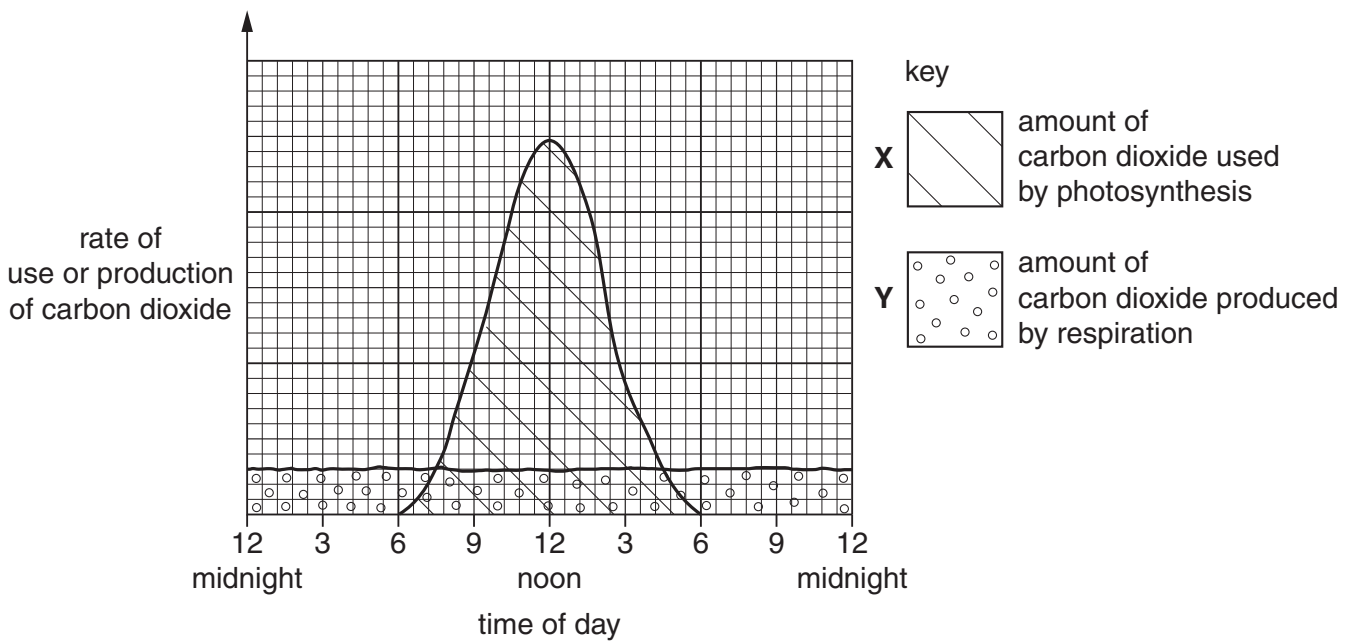
.....

.....

.....

..... [2]

(b) Look at the graph. It shows the amount of carbon dioxide used by photosynthesis and the amount of carbon dioxide produced by respiration in a plant over a 24-hour period.



(i) At what time of day is most carbon dioxide used by photosynthesis?

..... [1]

(ii) Write down the time of both compensation points.

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

(iii) The shaded area X is greater than the shaded area Y.

Explain why this is important for a plant.

.....

.....

..... [2]

[Total: 7]

5 Photosynthesis takes place in green plants.

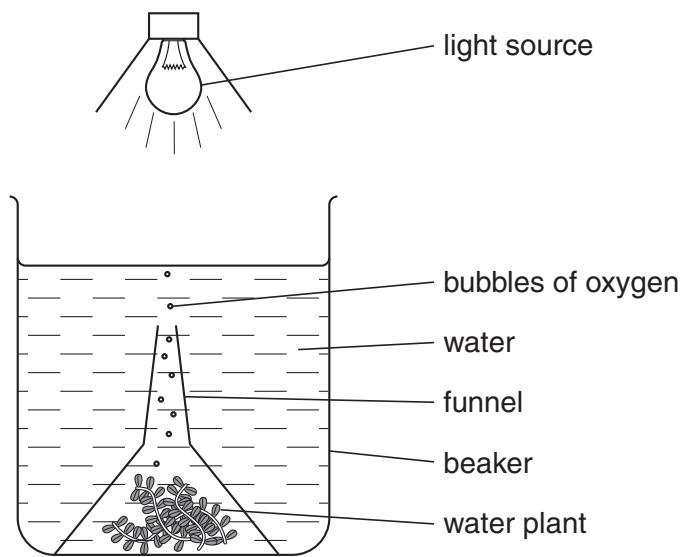
(a) Write down three factors that can limit the rate of photosynthesis.

- 1 .....
- 2 .....
- 3 .....

[2]

(b) The rate at which photosynthesis takes place can be measured.

One way to do this is to count the bubbles of oxygen given off by a water plant in one minute.



We can never be sure that a measurement tells us the true value of a quantity being measured.

Explain why trying to count the number of bubbles in one minute in this experiment may not give a **true value** for the rate of photosynthesis.

- .....
- .....
- .....
- .....

[3]

[Total: 5]

6 There is a link between sickle-cell anaemia and malaria.

(a) Explain how sickle-cell anaemia is caused.

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

(b) In parts of the world where malaria is common there are more people that have sickle-cell anaemia.

Explain why.

.....  
.....  
.....  
..... [3]

[Total: 5]

7 Neil and Anita want to have a baby.

They are worried that they might be carriers for cystic fibrosis, a genetic disorder.

They have a genetic test using DNA technology.

Explain how the test is carried out.

You **must** include these words in your answer.

**autoradiography      DNA      gene probe      white blood cells**

.....  
.....  
.....  
.....  
.....  
..... [4]

[Total: 4]



8 Steve is an athlete.

(a) He releases energy from food chemicals by the process of respiration.

Explain what happens to this energy **as** it is released by respiration.

..... [1]

(b) Describe what happens to muscle tissue when provided with this energy.

..... [1]

(c) Steve has his heart rate and blood pressure monitored at rest by his trainer.

Suggest why different athletes have different ranges of resting heart rate and blood pressure.

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

(d) When athletes exercise hard, they respire anaerobically.

Write down the word equation for anaerobic respiration.

..... [2]

[Total: 6]

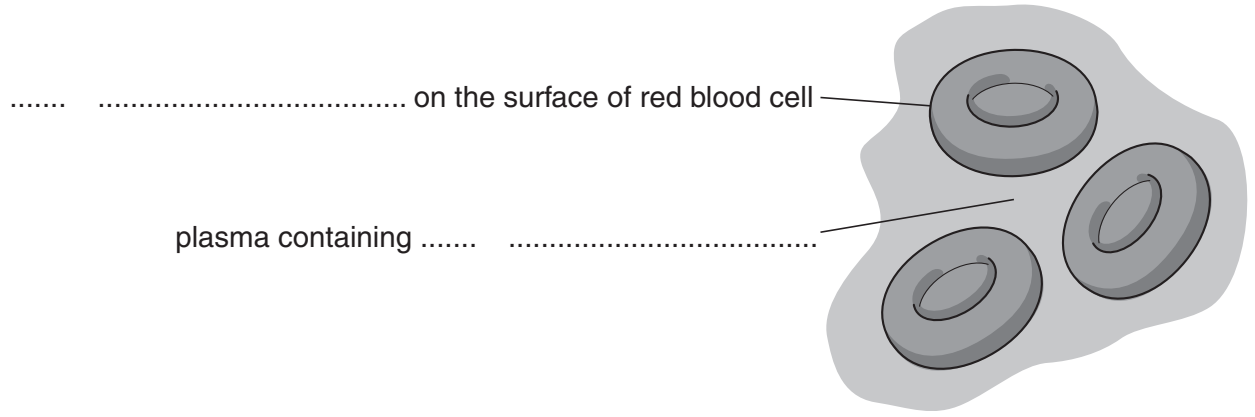
9 Human blood can be group **A**, **B**, **AB** or **O**.

(a) Look at the diagram of blood from a person who is **blood group B**.

Complete the labels using letters and words from the tables.

Each label needs a letter **and** a word.

letter	word
<b>A</b>	<b>antibodies</b>
<b>B</b>	<b>antigens</b>
<b>O</b>	<b>dominant</b>
	<b>haemoglobin</b>
	<b>recessive</b>



[2]

- (b) During blood transfusions it is important to make sure that the donor and recipient are compatible.

For this to happen, the antigens in the donor's blood must not match the antibodies in the recipient's blood.

The table shows blood groups for both donors and recipients.

		donor			
		A	B	AB	O
recipient	A	✓		✗	
	B		✓		
	AB			✓	
	O	✗			✓

Complete the table with ticks (✓) or crosses (✗) to show the compatibility for each of the blood groups.

Some have been done for you. [3]

- (c) Transfusing even a small amount of blood that does not match may lead to the death of the recipient.

Explain why.

.....

.....

.....

..... [2]

[Total: 7]

**END OF QUESTION PAPER**

**PLEASE DO NOT WRITE ON THIS PAGE**



**Copyright Information**

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.