

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

A223/02

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

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)

**Wednesday 16 June 2010
Morning**

Duration: 1 hour



| | | | |
|--------------------|--|-------------------|--|
| Candidate Forename | | Candidate Surname | |
|--------------------|--|-------------------|--|


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

MODIFIED LANGUAGE

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 reduced 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.

.....

.....

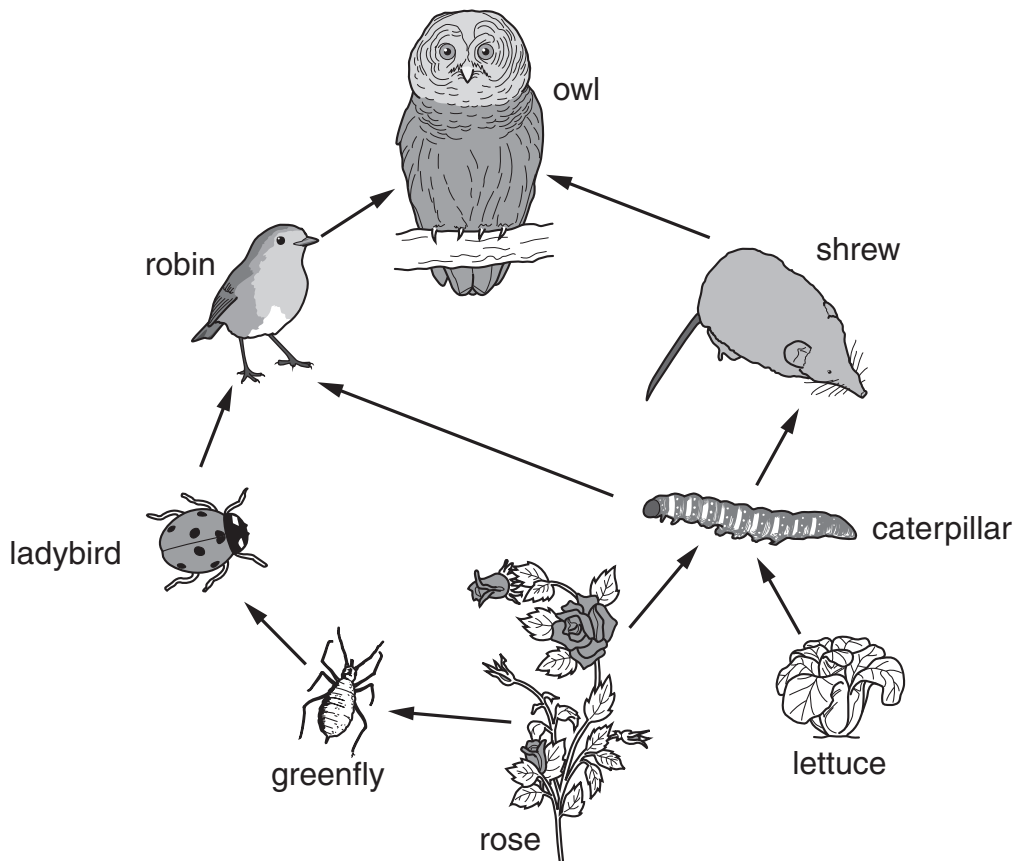
.....

..... [2]

[Total: 2]

3 Look at the food web.

The food web shows a number of food chains.



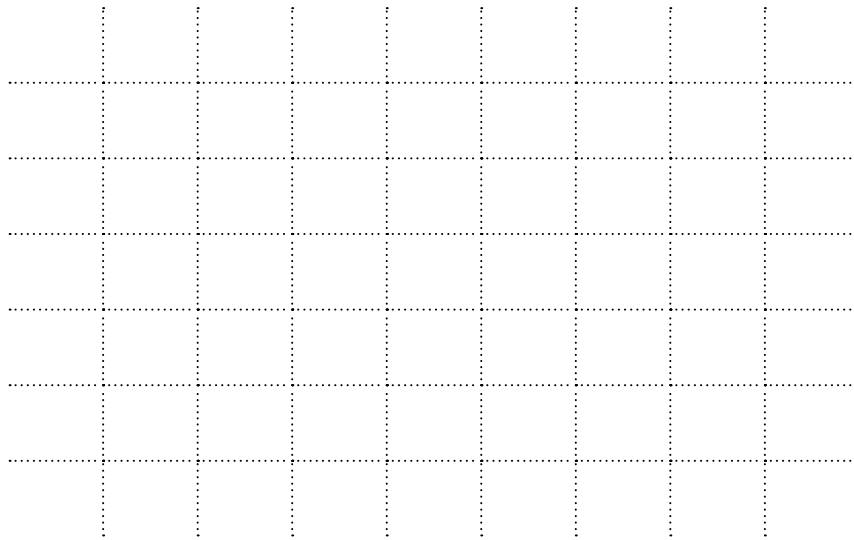
(a) Write down one food chain shown in the food web.

.....

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.

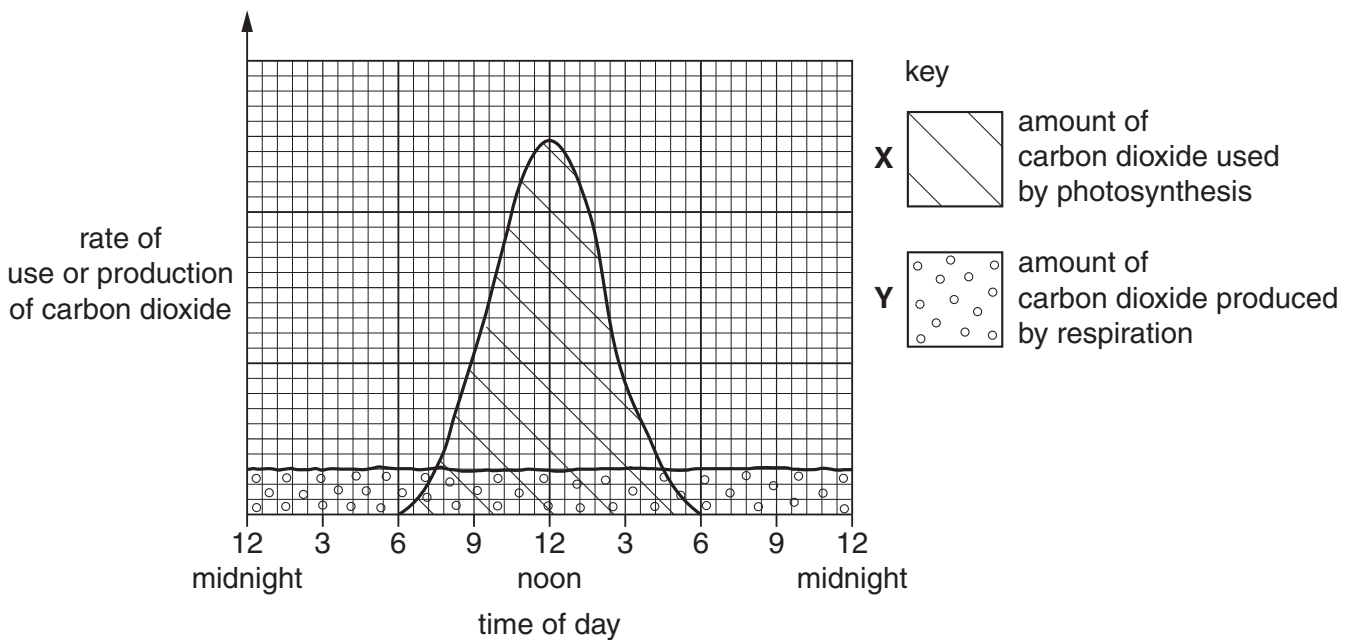
.....

.....

.....

..... [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.

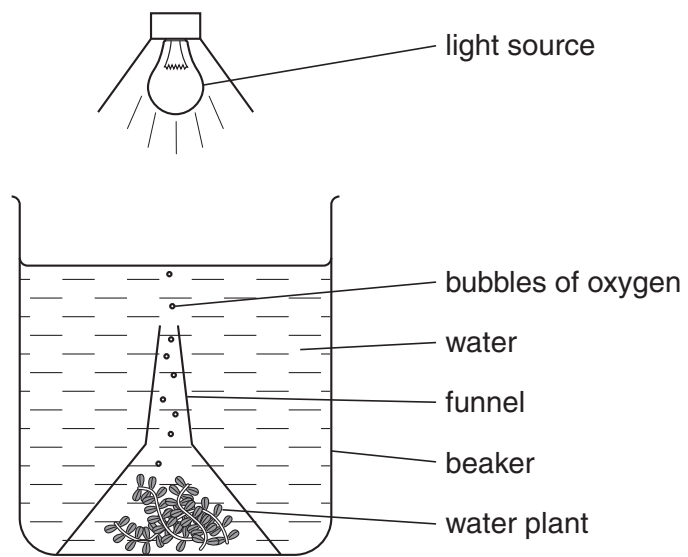
(a) Write down three factors that can limit the rate of photosynthesis.

- 1
- 2
- 3

[2]

(b) The rate of photosynthesis 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) There are more people that have sickle-cell anaemia in parts of the world where malaria is common.

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]

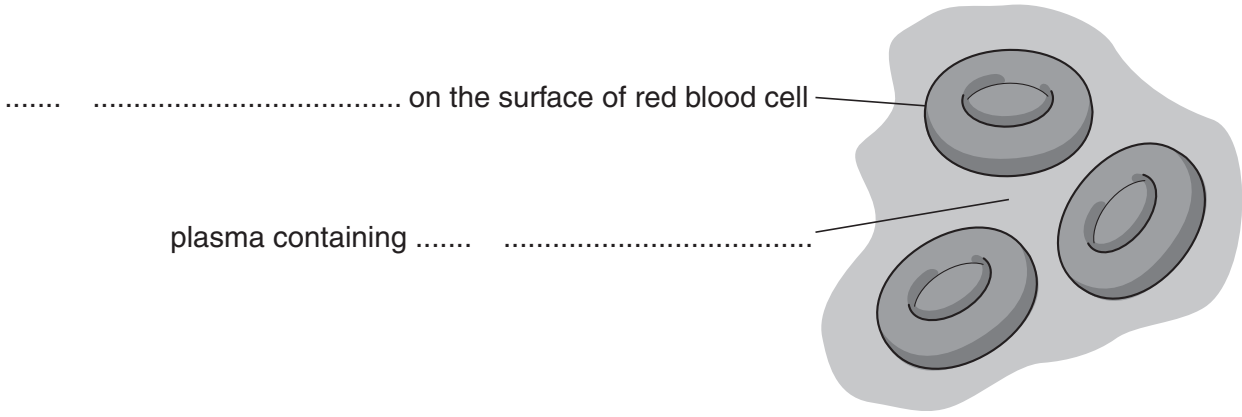
9 Human blood can be group **A**, **B**, **AB** or **O**.

(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 |
|---|--|
| <p>A</p> <p>B</p> <p>O</p> | <p>antibodies</p> <p>antigens</p> <p>dominant</p> <p>haemoglobin</p> <p>recessive</p> |



[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) Giving someone 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

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