

Tuesday 12 June 2012 – Morning

**GCSE 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.

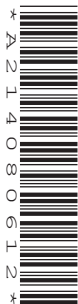
OCR supplied materials:

- Insert (inserted)

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: 1 hour




Candidate forename		Candidate surname	
--------------------	--	-------------------	--

Centre number						Candidate number				
---------------	--	--	--	--	--	------------------	--	--	--	--

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. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- 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).
- 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 ‘Alien Invaders’.

The article is about alien invasive species in Europe.

(a) The article states that the alien invasive species are reducing biodiversity.

Explain what biodiversity means.

..... [1]

(b) Thirty years ago there were 600 alien invasive species in Europe.

(i) Use the article to help you calculate the number of alien invasive species that are present in Europe today.

Show your working.

answer = [2]

(ii) It is not possible to know the true number of alien invasive species now present in Europe.

A student suggests a range in which the true value lies.
The student’s lower value is 600.

Suggest why the student’s range is incorrect.

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

(iii) Suggest **two** reasons why it is important that we know which alien invasive species are living in Europe today.

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

(iv) Explain why it is not possible to know the true numbers of alien invasive species present in Europe.

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

(c) Scientists are now considering using biological control to reduce the numbers of alien invasive species.

(i) Suggest what is meant by biological control.

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

(ii) Suggest how using biological control could have disastrous consequences for the environment.

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

[Total: 12]

2 This question is about photosynthesis.

(a) Describe in detail the main stages involved in photosynthesis.
Use ideas about energy and rearrangement of atoms in your answer.

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

(b) One way that plants use glucose is to convert it to starch for storage.

(i) Describe **two** other ways that glucose can be used by plants.

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

(ii) Starch is a better storage product than glucose.

Explain why.

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

(c) The cells in plant roots can absorb minerals from the soil.

Name and describe the process that these cells use to absorb minerals.

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

[Total: 10]

3 This question is about the malarial parasite and sickle-cell anaemia.

(a) Explain the cause of sickle-cell anaemia.

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

(b) Describe the symptoms of sickle-cell anaemia.

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

(c) Sickle-cell anaemia is a very harmful condition.

In areas with malaria there are more people with sickle-cell anaemia than in non-malarial areas.

Explain why.

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

[Total: 8]

4 A lack of vitamin A in humans can cause blindness.

Rice does not contain vitamin A.
Some people who only have rice to eat may go blind.

A scientist genetically modified rice to produce vitamin A.
He used daffodils which can produce vitamin A.
This new rice is called Golden Rice.

Golden Rice could prevent many cases of blindness.

(a) Explain how the scientist performed this genetic modification.
Use the following words in your answer

- vector
- isolated
- transferred.

.....

.....

.....

.....

.....

..... [3]

(b) There are ethical, social and economic implications of releasing genetically modified organisms into the environment.

Five people discuss these implications.

Peter
Pollen may transfer the genes to other plants, contaminating them. This should not be allowed.

William
Genetic modification is the same process as genetic engineering.

Anita
More people will buy the Golden Rice so farmers will make more money.

Jane
I think genetic modification of crop plants may change the way people traditionally live.

Julie
I think genetic modification is great because it shows what scientific knowledge can achieve.

(i) Which person is talking about an economic implication?

name [1]

(ii) Which person is talking about a social implication?

name [1]

(iii) Which person is talking about an ethical implication?

name [1]

[Total: 6]

5 Janine wins a gold medal in a race in the London Olympics.



(a) Her coach tells her that “ATP is your energy currency”.

Explain what her coach means by this.

.....

.....

.....

..... [2]

(b) Janine’s muscles ache after the race.

Her coach tells her that this is due to the type of respiration that produces an ‘oxygen debt’.

(i) Name and describe this type of respiration.

.....

.....

.....

..... [3]

(ii) This type of respiration makes Janine’s muscles ache, so she can only exercise like this for a limited period of time.

Write down one other **disadvantage** of this type of respiration.

.....

..... [1]

(iii) Explain why this type of respiration may be advantageous under certain conditions.

.....

..... [1]

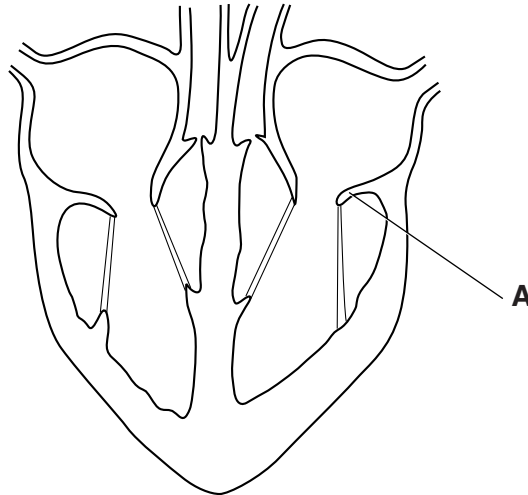
[Total: 7]

6 Humans have a double circulatory system.

(a) Explain what is meant by a double circulatory system.

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

(b) Look at the diagram of the heart.



(i) Name structure **A** and describe its job.

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

(ii) Where else in the circulatory system would you find structures that perform a similar job to structure **A**?

..... [1]

(c) Explain how oxygen is transferred from the blood to the cells in tissues.



One mark is for a clear, ordered answer.

.....
.....
.....
..... [3 +1]

[Total: 8]

Turn over

7 James has a fever.
He goes to see his doctor.

(a) The doctor asks James some questions.

Explain why James’s personal medical information must be

- recorded
- made available to other medical practitioners.

.....

.....

.....

..... [2]

(b) A nurse monitors James’s temperature over the next few days.

How could the nurse make sure that her measurements are accurate and reliable?

.....

.....

.....

..... [2]

[Total: 4]

END OF QUESTION PAPER

11
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

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 and is freely available to download from our public website (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.