Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

A223/02

TWENTY FIRST CENTURY SCIENCE
BIOLOGY A

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

WEDNESDAY 15 JUNE 2011: Morning
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

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)

READ INSTRUCTIONS OVERLEAF

DC (LEO/SW) 11MEP06067 45923

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. 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.**

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.**

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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) The anti-wrinkle cream contains different substances.

(i) It is not possible to say which of these substances is the effective ingredient.

Explain why.

_____

_____ **[1]**

(ii) How should the scientists extend the study to find out which is the effective ingredient?

_____

_____ **[1]**

(b) 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]

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

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

_____

_____

_____ **[2]**

(d) Look at the comments made by the three members of the public.

(i) Use information in the article to suggest why PETER'S comment is incorrect.

_____

_____ **[2]**

(ii) In what way has WENDY misunderstood the results of the trial?

_____

_____

_____ **[2]**

(iii) Suggest why SUE may have wasted her money.

_____

_____ **[1]**

(e) Ageing skin and sun-damaged skin become wrinkled.

Suggest a mechanism to explain how this might happen.

_____

_____

_____ **[2]**

[Total: 13]

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2 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]**

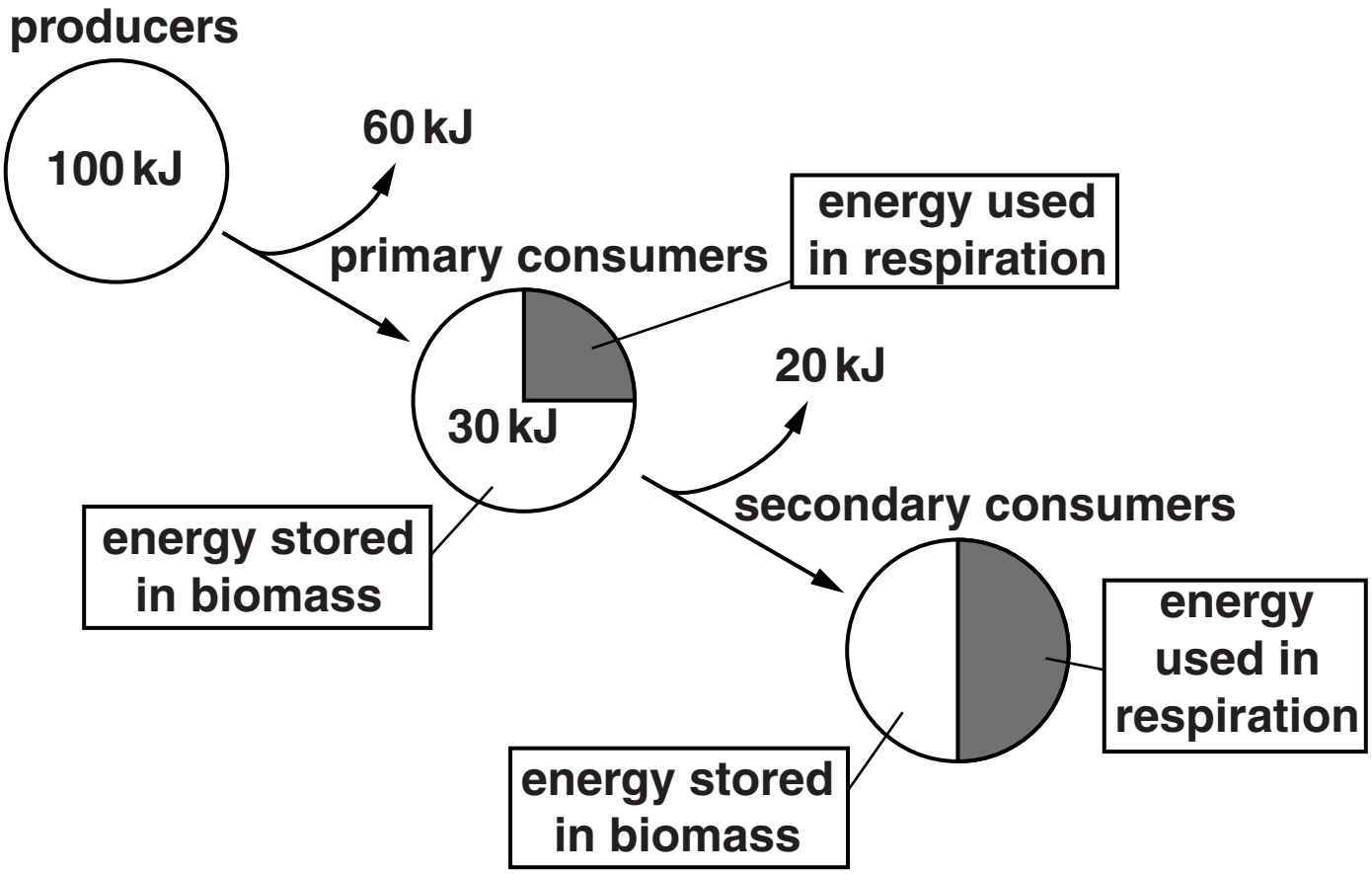
(b) In an ecosystem both autotrophs and heterotrophs are found.

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]

BLANK PAGE

3 Plants produce glucose by photosynthesis.

(a) Although plants produce glucose they convert it into starch.

Explain why.

_____

_____

_____ **[2]**

(b) Plants can convert starch into proteins by the addition of nitrogen from nitrates.

Plants absorb nitrates from the soil by ACTIVE TRANSPORT.

Explain what is meant by active transport.

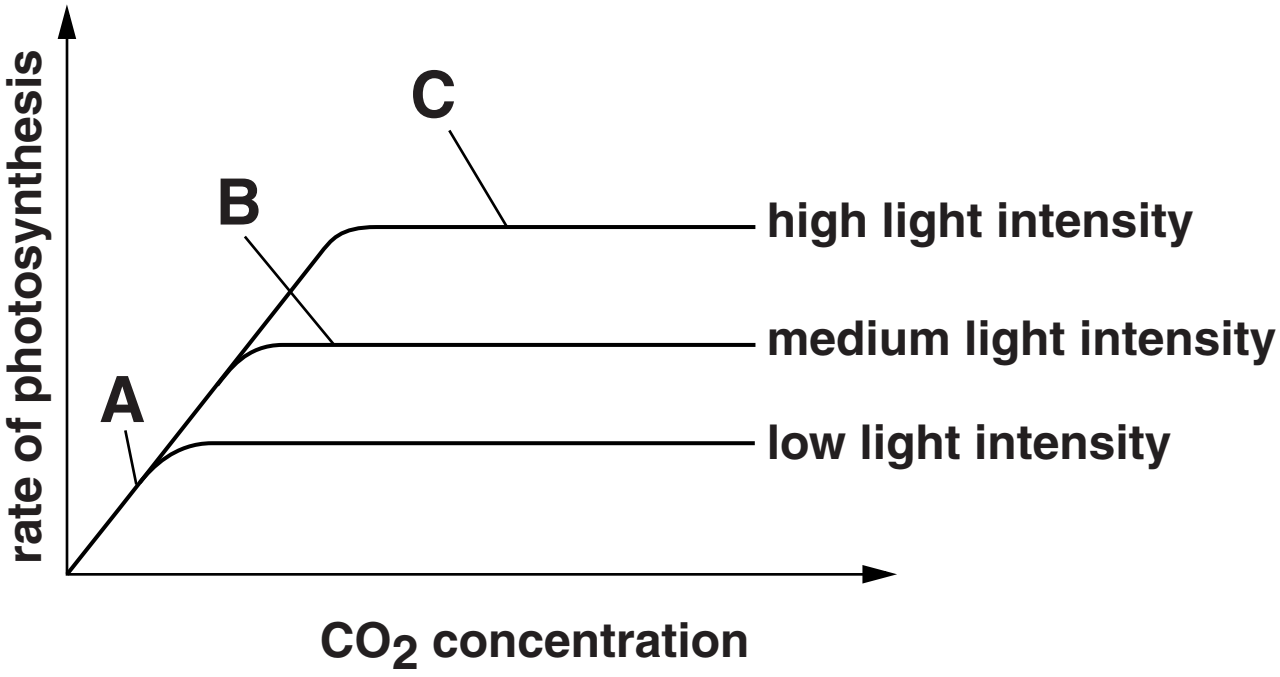
_____

_____

_____ **[2]**

(c) **The production of glucose by photosynthesis is affected by limiting factors.**

Look at the graph.



(i) **What is the limiting factor at A?**

_____ **[1]**

(ii) **What is the limiting factor at B?**

_____ **[1]**

(iii) **What OTHER factor is most likely to be limiting at C?**

_____ **[1]**

[Total: 7]

4 Symbiosis, commensalism and parasitism are all examples of types of relationships between organisms.

(a) Explain what is meant by symbiosis and commensalism.

symbiosis _____

_____

commensalism _____

_____

[2]

(b) Parasitism is a close association between two different organisms.

Explain the effect of this relationship on the PARASITE and its HOST.

_____

_____

_____ **[2]**

(c) ***Plasmodium*** **is the parasite that causes malaria. It has certain features that enable it to be successful.**

For one OTHER named parasite, explain a feature that enables it to be successful.

name of parasite _____

feature _____

explanation _____

_____

[3]

(d) Carriers for sickle-cell anaemia have some protection from malaria.

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

_____

_____ **[2]**

(ii) Explain why sickle-cell CARRIERS do not have the full symptoms of the condition.

_____

_____ **[2]**

[Total: 11]

5 Jessica is training for the London Olympics.

(a) When exercising, Jessica's muscles respire both aerobically and anaerobically.

Describe THREE ways in which aerobic respiration is different from anaerobic respiration.

DIFFERENCE 1 _____

_____

DIFFERENCE 2 _____

_____

DIFFERENCE 3 _____

_____

[3]

(b) Anaerobic respiration can lead to an oxygen debt.

Explain what is meant by an oxygen debt.

_____

_____

_____

_____ **[2]**

[Total: 5]

6 Human blood groups can be A, B, AB or O.

(a) Complete these sentences about the inheritance of blood groups.

Choose words from this list.

ONE
THREE
FOUR
FIVE
CO-DOMINANT
DOMINANT
OPPOSITE
RECESSIVE

Human ABO blood type is determined by

_____ gene(s) with

_____ possible allele(s).

A and B are _____ .

O is _____ to both A and B. [4]

(b) A person who has blood group AB marries a person who has blood group O.

(i) Complete this genetic diagram to show possible genetic combinations of any children that they might have.

[3]

(ii) Write down the possible BLOOD GROUPS of their children.

_____ **[2]**

[Total: 9]

END OF QUESTION PAPER