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Edexcel GCSE

Biology/Additional Science
Unit B2: The Components of Life

Foundation Tier

Tuesday 15 May 2012 – Morning Time: 1 hour	Paper Reference 5BI2F/01
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You must have: Calculator, ruler	Total Marks
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

Answer ALL questions

**Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then
mark your new answer with a cross ☒.**

Water and mineral uptake by plants

1 (a) Complete the sentences by putting a cross (☒) in the box next to your answer.

(i) Plants absorb water from the soil.

The plant cells that absorb water from the soil are called

(1)

A root hair cells

B palisade cells

C stomata cells

D xylem cells

(ii) These cells absorb water by a process known as

(1)

A active transport

B osmosis

C photosynthesis

D transpiration

(b) Plants also absorb mineral ions from the soil.

Use words from the box to complete the sentences.

(3)

active transport

leaves

xylem

photosynthesis

phloem

roots

Plants absorb mineral ions from the soil through their by a

process called The mineral ions are then transported up

the stem through vessels.



(c) Magnesium and nitrates are two mineral ions that are absorbed by plants.

The table shows the amount of magnesium ions and nitrate ions in the tips of sunflower and wheat plants.

type of plant	mineral ion content / arbitrary units	
	magnesium ions	nitrate ions
sunflower	0.730	0.147
wheat	0.225	0.226

(i) Compare the mineral ion content in the tips of these two plants.

(2)

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(ii) Magnesium is used by plant cells to make chlorophyll.

Describe the function of chlorophyll in plant cells.

(2)

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(Total for Question 1 = 9 marks)



Race horses

2 Casper is a horse training for the Grand National.
Casper's diet contains an increased amount of carbohydrate.
Casper runs several miles each day.

(a) (i) Use words from the box to complete the sentences.

(2)

fat	oxygen	protein	carbon dioxide	nitrogen
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During training, Casper's heart rate increases to supply his muscles with
more

Casper's breathing rate increases to remove excess
from his blood.

(ii) Explain why Casper needs a diet containing an increased amount of
carbohydrate.

(3)

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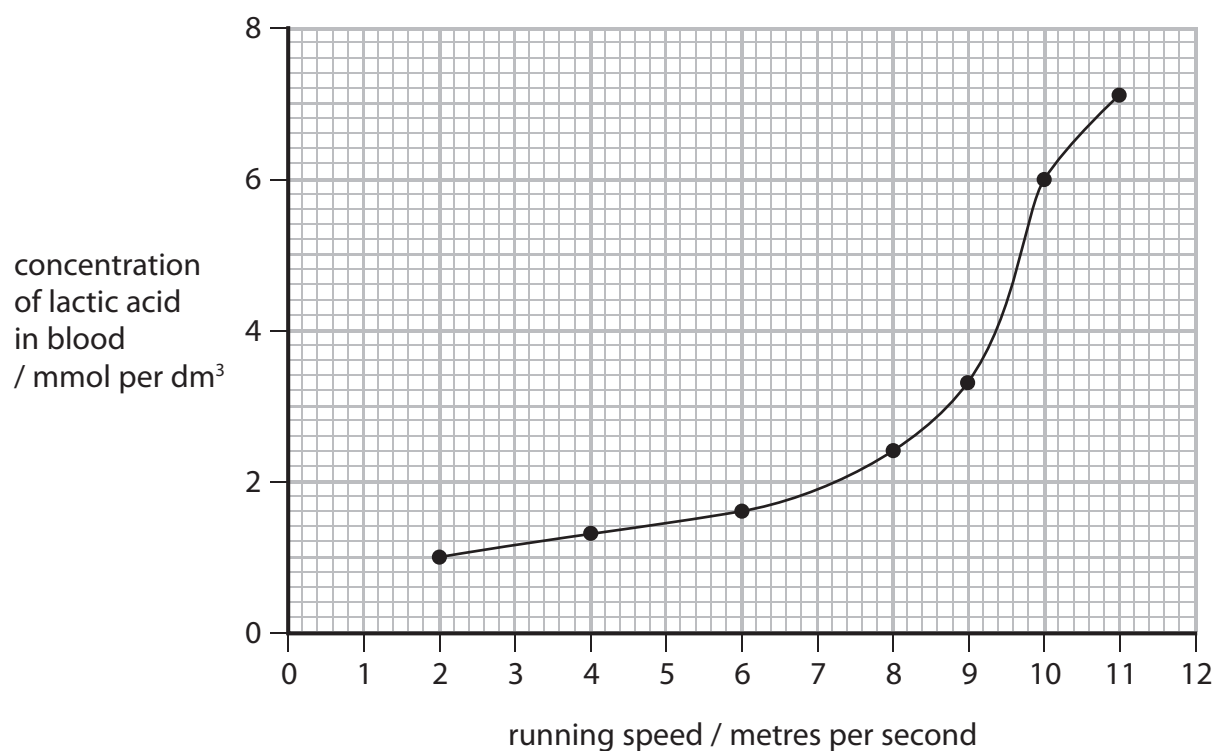
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(b) The graph shows the concentration of lactic acid in Casper's blood as his running speed increases.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The difference in the concentration of lactic acid in Casper's blood between 2 and 10 metres per second is

(1)

- A 1 mmol per dm³
- B 2 mmol per dm³
- C 5 mmol per dm³
- D 8 mmol per dm³

(ii) Explain why the concentration of lactic acid in Casper's blood changes as his speed increases.

(2)

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(Total for Question 2 = 8 marks)



Using glucose

- 3** Leaf cells produce glucose.
Plants can use glucose to make oils, cellulose and DNA.

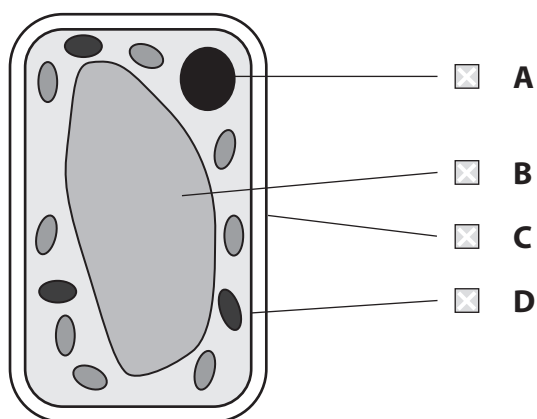
(a) (i) Oils are needed to make cell membranes.

The diagram shows a plant cell.

Which label on the diagram shows the cell membrane?

Put a cross (☒) in the box next to your answer.

(1)



(ii) Cellulose is found in plant cell walls.

Describe the function of cell walls in plant cells.

(2)

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(iii) The nucleus contains chromosomes.
Chromosomes are made up of DNA.

Describe the structure of DNA.

(2)

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- (b) The table shows the concentration of glucose found in plant cells at different times of the day.

time of day	6am	9am	midday	3pm	6pm	midnight
concentration of glucose / mg per g	2	6	18	12	2	2

- (i) Calculate the change in the concentration of glucose from 6am to midday.

(1)

answer = mg per g

- (ii) Describe the pattern shown in the concentration of glucose from 6am to midnight.

(2)

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- (iii) Suggest **two** reasons why the concentration of glucose in the plant cells changes between 3pm and 6pm.

(2)

1.....

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2.....

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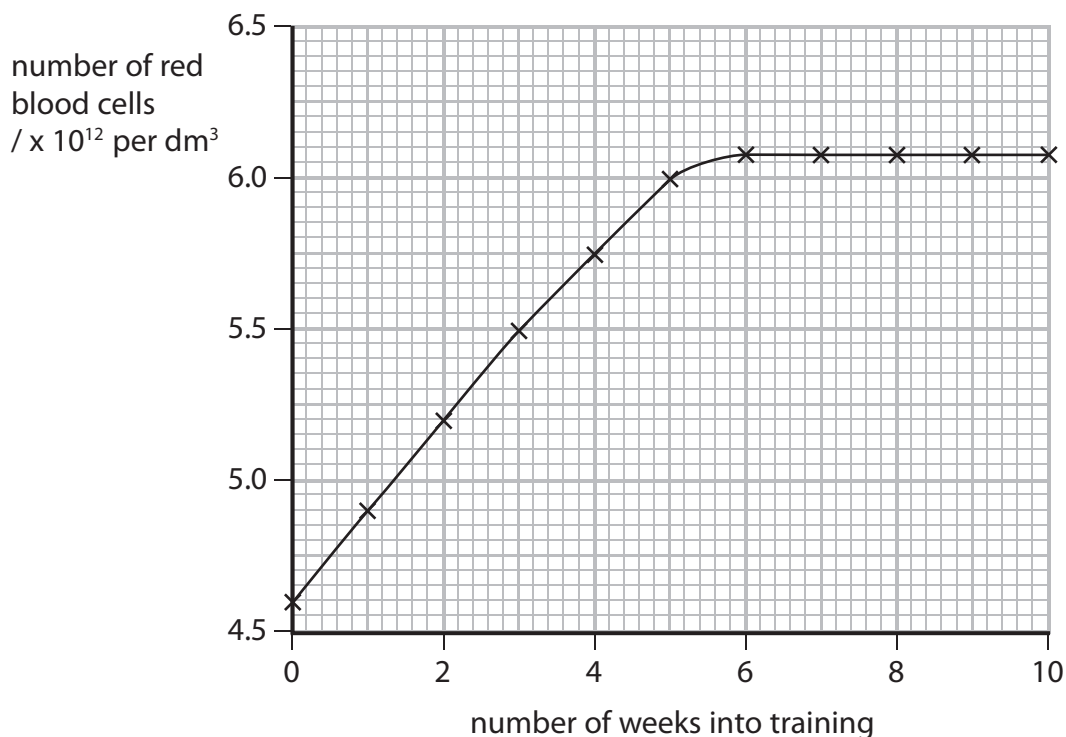
(Total for Question 3 = 10 marks)



Altitude training

- 4 Some athletes train at high altitudes (over 2000 m above sea level).
There is less oxygen in the air at high altitudes.

(a) The graph shows the number of red blood cells in the blood of an athlete training at high altitudes, over a ten-week period.



- (i) Describe the change in the number of red blood cells during this ten-week training period.

(2)

- (ii) Suggest the minimum training period this athlete needs to produce the highest number of red blood cells.

(1)

- (iii) State the function of red blood cells.

(1)



(b) When athletes train, the size of their hearts can increase.

Suggest how an increase in the size of the heart is an advantage to an athlete.

(2)

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(c) (i) Draw **two** straight lines from the function to the blood vessels that carry out that function.

(2)

function	blood vessel
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> transport blood away from the heart </div>	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> ● pulmonary artery </div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> ● pulmonary vein </div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> ● aorta </div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> ● vena cava </div>
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> ● capillary </div>

(ii) Name the structures in the heart that prevent the backflow of blood.

(1)

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(Total for Question 4 = 9 marks)



Enzymes

5 (a) Complete the sentences by putting a cross (☒) in the box next to your answer.

(i) Enzymes are

(1)

- A cells
- B hormones
- C proteins
- D sugars

(ii) An enzyme is a biological catalyst that

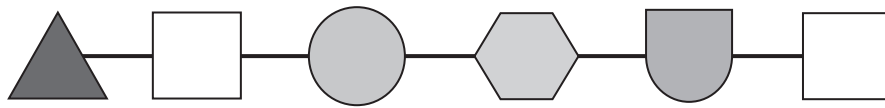
(1)

- A slows down all chemical reactions
- B speeds up a chemical reaction
- C prevents all chemical reactions taking place
- D has no effect on a chemical reaction



(b) The diagrams show two sequences of six amino acids.

Sequence 1 is found in an enzyme called catalase.



Sequence 2 is found in an enzyme called amylase.



(i) Suggest how the structures of the enzymes, catalase and amylase, are different from each other.

(2)

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(ii) Suggest why the action of these two enzymes will be different.

(2)

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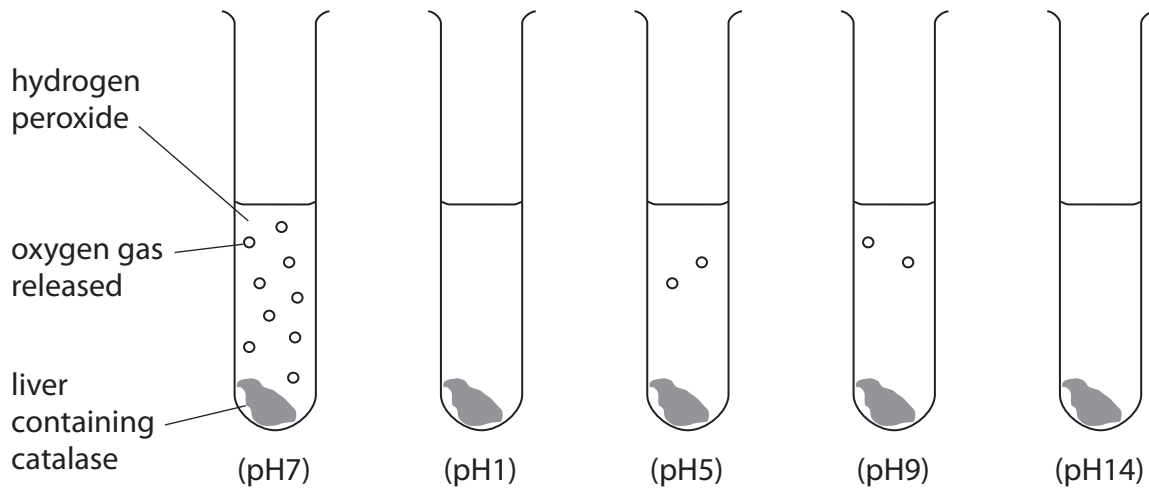
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*(c) A student carried out an investigation to study the effect of pH on the activity of catalase.

In the presence of catalase, hydrogen peroxide breaks down to release oxygen gas.

The student set up five test tubes, as shown in the diagram, and observed the amount of oxygen gas released.



Explain the effect of pH on the enzyme catalase in this investigation.

(6)

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(Total for Question 5 = 12 marks)

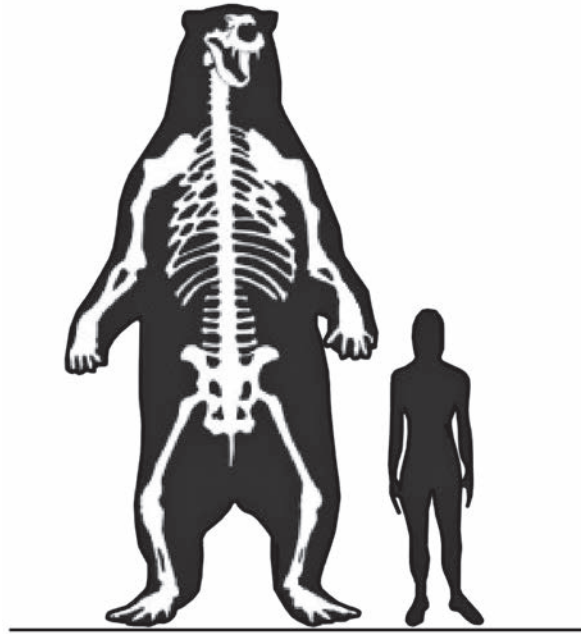


Bears

- 6 A small number of fossil bones from a very large bear was found in South America in 1935.

The bones were estimated to be about one million years old.
Scientists used these bones to predict the shape and size of the bear.

The diagram shows the bear and a person who is 165 cm tall.



- (a) (i) Estimate the height of the bear.

(2)

answer = cm

- (ii) Which process occurs in animal cells that results in growth?

(1)



(b) Explain why scientists can only make predictions about the size and shape of animals when working from fossil evidence.

(3)

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*(c) Some species of bears eat leaves.

Describe how the structure of a leaf is adapted for photosynthesis.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS



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