

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCSE**

Centre Number

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Candidate Number

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# Biology/Additional Science

## Unit B2: The Components of Life

**Foundation Tier**

Friday 5 June 2015 – Afternoon

**Time: 1 hour**

Paper Reference

**5BI2F/01**

**You must have:**  
Calculator, ruler

Total Marks

### 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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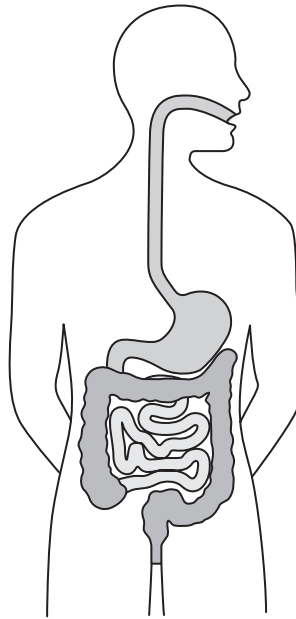
**PEARSON**

**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 ☒.**

**Digesting food**

**1** The diagram shows the human digestive system.



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

(2)

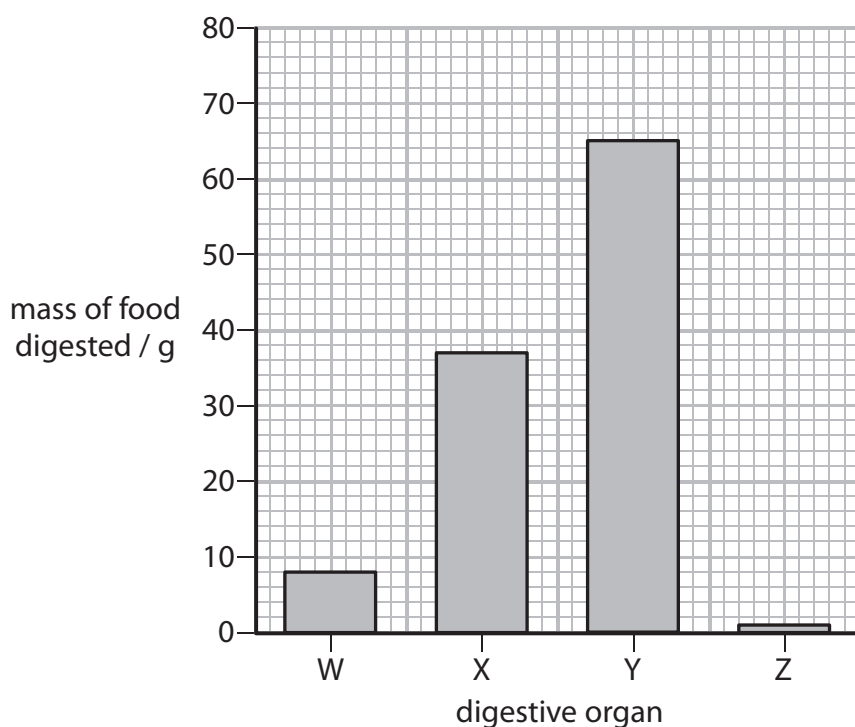
active	amino	DNA	lactic	soluble
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During digestion, large molecules are broken down into  
small ..... molecules.

Proteins are large molecules that are broken down into ..... acids.



(b) The graph shows the mass of food digested by four different digestive organs.



(i) Calculate the difference in the mass of food digested by organ **W** and organ **X**.

(2)

..... g

(ii) The food digested in organ **Y** was mainly carbohydrate.

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

Organ **Y** is most likely to be the

(1)

- A** oesophagus
- B** stomach
- C** small intestine
- D** large intestine



(c) State the role of peristalsis in the alimentary canal.

(1)

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.....

(d) Describe how digested food molecules move from the alimentary canal to the heart.

(2)

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**(Total for Question 1 = 8 marks)**

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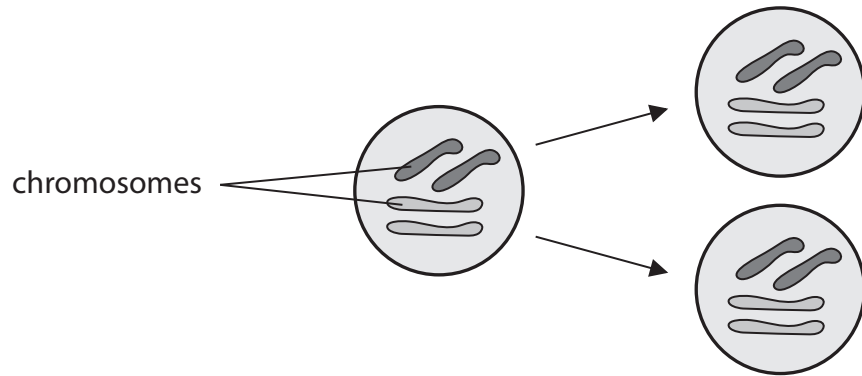


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## Cell division

2 The diagram shows cell division by mitosis.



(a) Describe how the diagram shows that this cell division is mitosis.

(2)

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.....

(b) A skin cell divides by mitosis once every day to produce new skin cells.

Calculate how many days it would take to produce 16 skin cells from one skin cell.

(2)

..... days



(c) Cloning mammals involves mitosis.

Describe **one** advantage and **one** disadvantage of cloning mammals.

(2)

Advantage.....  
.....  
.....  
.....

Disadvantage.....  
.....  
.....  
.....

(d) Some cells divide by meiosis.

Use words from the box to complete the sentences.

(2)

double	two	stem cells	four	gametes
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Meiosis is used in sexual reproduction to produce .....

Meiosis produces ..... haploid cells.

**(Total for Question 2 = 8 marks)**



### Olympic training

3 The photograph shows an athlete training on a running machine.

The mask she is wearing measures the volume of oxygen she uses per minute.



©Guardian News and Media Limited

(a) The athlete runs faster in a race than when she is training.

Explain why running faster changes the volume of oxygen used per minute.

(2)

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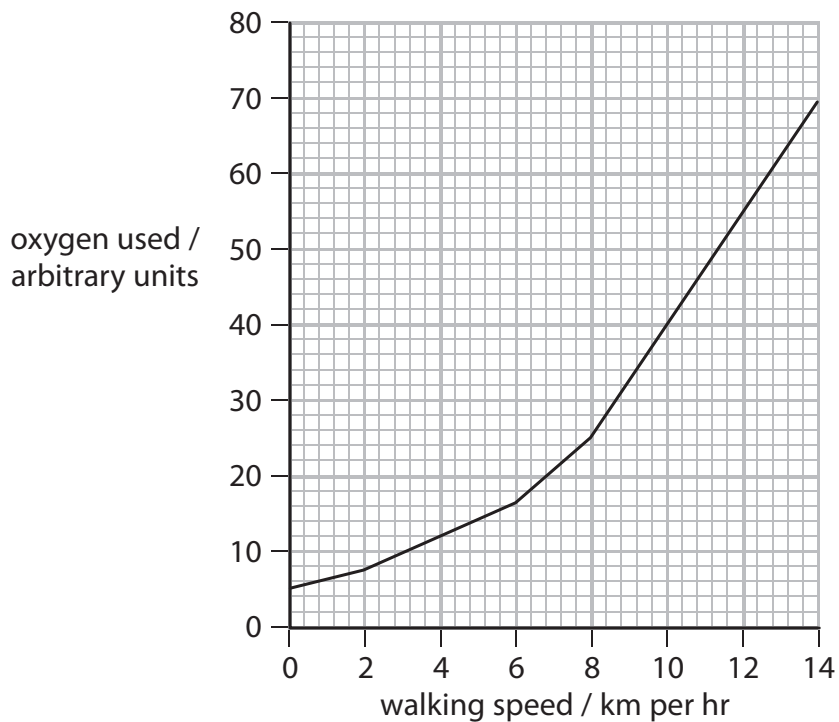
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(b) The graph shows the oxygen used by an Olympic walker during a training session.



(i) Describe how walking speed affects the amount of oxygen used by this Olympic walker.

(2)

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(ii) Explain why this Olympic walker did not get cramp in their muscles when walking at a speed of 4 km / hour.

(3)

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(c) Complete the word equation for aerobic respiration.

(1)

glucose + oxygen  $\longrightarrow$  ..... + water

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

Oxygen moves from the blood into cells by

(1)

- A breathing
- B diffusion
- C osmosis
- D transpiration

(e) Cardiac output increases during exercise.

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

When cardiac output is calculated, the stroke volume is multiplied by the

(1)

- A time
- B heart rate per minute
- C volume of the right ventricle
- D breathing rate

**(Total for Question 3 = 10 marks)**

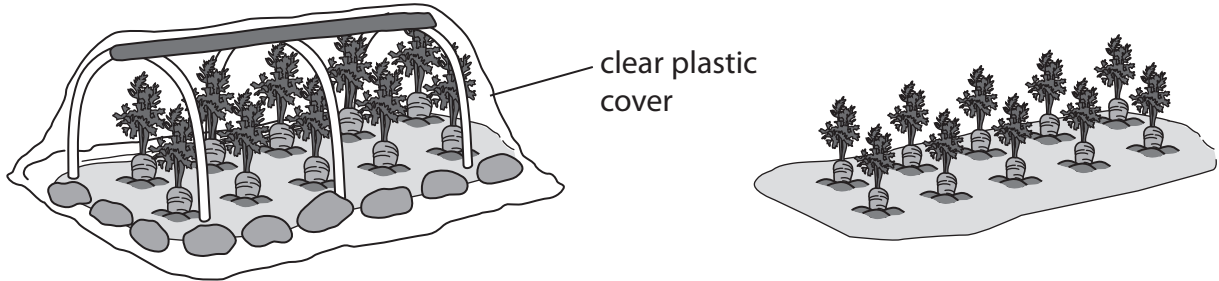


## Growing vegetables

4 A gardener grew 20 carrot plants in his garden.

Ten plants were grown under a clear plastic cover.

Ten plants were grown without a clear plastic cover.



(a) Explain why it is important that the clear plastic cover is transparent.

(2)

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(b) (i) After 30 days, the gardener measured the height of each plant.

Describe how to calculate the mean height of the plants grown under the clear plastic cover.

(2)

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(ii) The table shows the mean height of each group of plants.

group of plants	mean height of plants after 30 days / cm
plants grown under the clear plastic cover	15.3
plants grown without the clear plastic cover	13.4

Calculate the difference in the mean height of the two groups of plants.

(1)

..... cm

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

The most likely reason for the difference in the mean heights is because the plants under the clear plastic cover

(1)

- A were in a warmer environment
- B received more light
- C absorbed more oxygen
- D were in a drier environment



(c) (i) Some gardeners add fertiliser, containing mineral ions, to the soil around their plants.  
Name the plant cell that is adapted to take in mineral ions and water from the soil.  
(1)

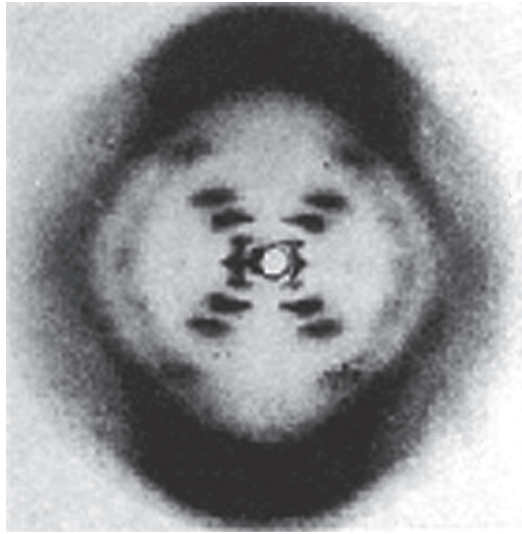
(ii) Describe how active transport moves mineral ions from the soil into plants.  
(3)

**(Total for Question 4 = 10 marks)**



## Cells

- 5 (a) Rosalind Franklin used this image in her study of the structure of DNA.



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

Rosalind Franklin obtained this image using

(1)

- A a light microscope
- B X-ray crystallography
- C an electron microscope
- D a digital camera

- (b) Scientists discovered that a DNA molecule is a double helix.

Describe the meaning of the term **double helix**.

(2)

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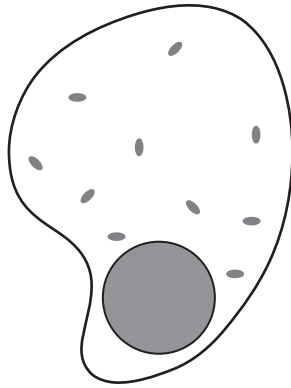


(c) The diagram shows an animal cell.

Draw a line to the part of the cell that contains most of the DNA.

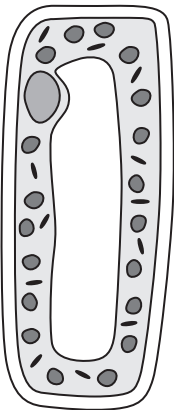
Label this line **X**.

(1)



P 4 4 6 7 4 A 0 1 5 2 4

\*(d) The diagram shows a cell from the leaf of a plant.



Describe the role of the structures in this plant cell.

(6)

A series of horizontal dotted lines provided for writing the answer to the question.



(e) Golden rice has been produced by genetic engineering.

Explain the health benefits of eating golden rice.

(2)

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**(Total for Question 5 = 12 marks)**

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### Using enzymes

6 Pectinase is an enzyme that is used to extract juice from apples.

In an investigation, 1 cm<sup>3</sup> of pectinase was added to 1 kg of chopped apples.

After 20 minutes, the volume of juice produced was measured.

This was repeated using different volumes of pectinase.

The table shows the results of this investigation.

volume of pectinase added / cm <sup>3</sup>	volume of apple juice produced / cm <sup>3</sup>
1	180
2	212
3	
4	269
5	300

(a) (i) Estimate the volume of apple juice that should be produced when 3cm<sup>3</sup> of pectinase was added.

(1)

..... cm<sup>3</sup>

(ii) The maximum volume of apple juice that can be produced from 1 kg of apples is 500 cm<sup>3</sup>.

Calculate the percentage of apple juice produced when 5 cm<sup>3</sup> of pectinase was added.

(2)

..... %



(iii) Suggest **two** ways of increasing the volume of apple juice produced when 5 cm<sup>3</sup> of pectinase is added to 1 kg of chopped apples.

(2)

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\*(b) Explain the action of enzymes in terms of the lock and key hypothesis.

You may use labelled diagrams to illustrate your answer.

(6)

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(c) The leaves of apple trees produce sugar.

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

Which vessel transports sugar from the leaves to the apples?

(1)

- A artery
- B capillary
- C phloem
- D xylem

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**(Total for Question 6 = 12 marks)**

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**TOTAL FOR PAPER = 60 MARKS**



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