Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology/Additional Science

Unit B2: The Components of Life

Foundation Tier

Wednesday 17 January 2018 – Morning
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.
- 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 ☒.

Plants

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

(i) The plant cells that absorb mineral ions from the soil are

(1)

☒ **A** guard cells

☒ **B** palisade cells

☒ **C** root hair cells

☒ **D** xylem cells

(ii) Plants absorb mineral ions by

(1)

☒ **A** active transport

☒ **B** osmosis

☒ **C** photosynthesis

☒ **D** transpiration

(b) Plants absorb carbon dioxide from the air.

Use words from the box to complete the sentences.

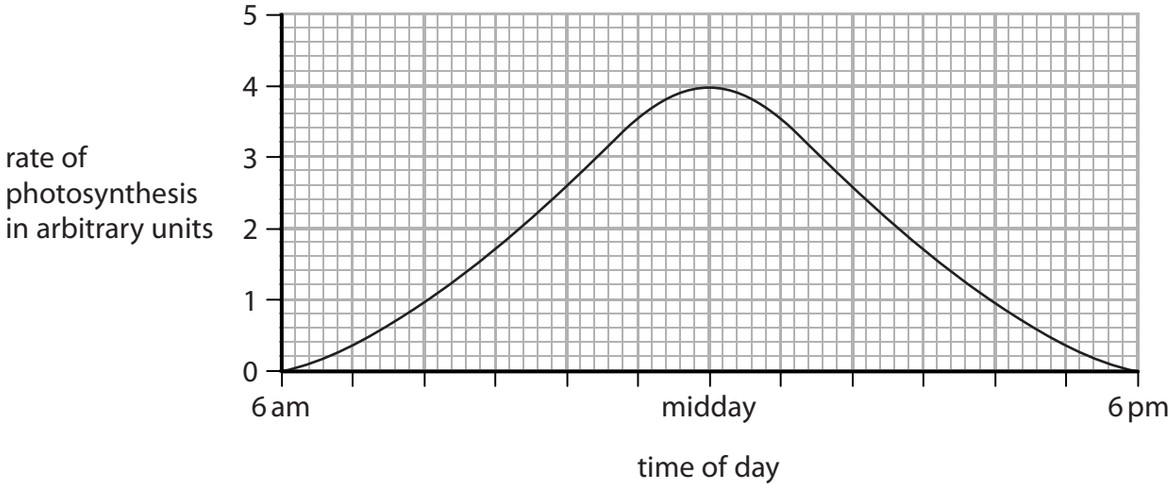
(2)

oxygen	nitrate ions	xylem
water	phloem	roots

During photosynthesis, carbon dioxide reacts with ..... to make the sugar glucose.

Sugars are transported through the ..... in the stem to other parts of the plant.

(c) The graph shows the rate of photosynthesis for a plant during one day.



(i) Describe how the rate of photosynthesis changes from 6 am to 6 pm.

(2)

.....

.....

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.....

(ii) Photosynthesis occurs in a leaf.

Describe how a leaf is adapted for photosynthesis.

(2)

.....

.....

.....

.....

(Total for Question 1 = 8 marks)

Digestion

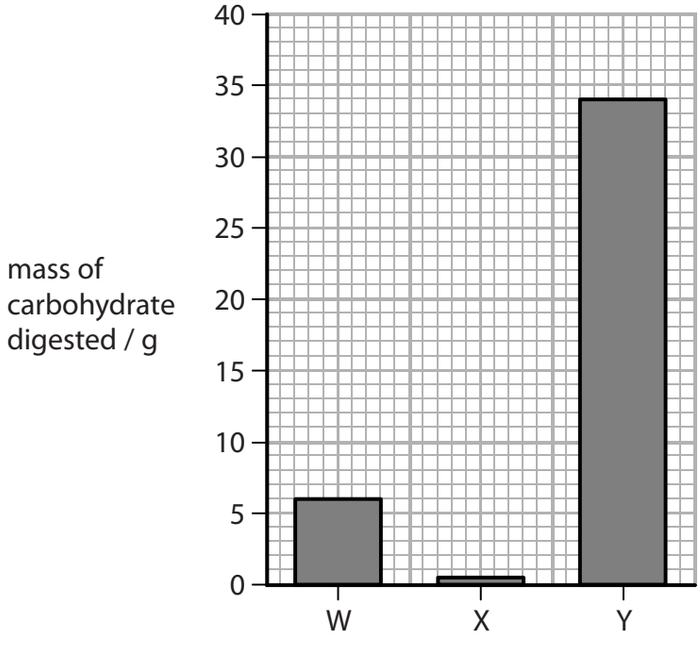
2 (a) The digestive system produces enzymes.

Draw one straight line from each enzyme to the nutrient that it breaks down.

(2)

enzyme	nutrient
lipase	carbohydrate
amylase	protein
protease	fat
	fibre

(b) The graph shows the mass of carbohydrate digested in three organs of the digestive system.



(i) Describe the difference in the mass of carbohydrate digested in organ W and organ Y.

(2)

(ii) The table shows the amount of time food remains in each organ.

organ	amount of time food remains in each organ / minutes
W	1
X	150
Y	180

Use the information in the graph and in the table to explain which organ is most likely to be the small intestine.

(2)

(iii) Suggest why the least amount of carbohydrate is digested in organ X.

(2)

(Total for Question 2 = 8 marks)

DNA and genetic engineering

3 (a) Use numbers from the box to complete the sentences.

(2)

2	3	4
23	46	92

The nucleus of a human muscle cell contains ..... chromosomes that are made of DNA.

In DNA, there are ..... different bases.

(b) Which of the following best describes the shape of a DNA molecule?

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

(1)

☒ **A** one strand coiled to form a single helix

☒ **B** one strand coiled to form a double helix

☒ **C** two strands coiled to form a single helix

☒ **D** two strands coiled to form a double helix

(c) Describe the contribution that Rosalind Franklin made to the understanding of DNA structure.

(2)

.....

.....

.....

.....

(d) Genetic engineering involves inserting a gene from one organism into the DNA of another organism.

(i) Describe how the gene from the first organism is obtained.

(2)

(ii) Herbicide resistant crop plants have been produced by genetic engineering.

Explain how a farmer can use herbicide resistant plants to increase the yield of a crop.

(2)

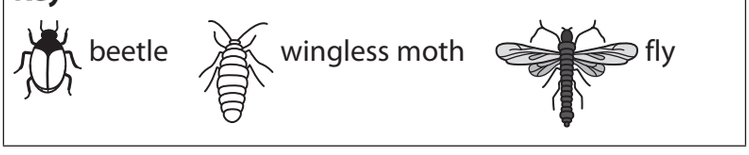
(iii) State **one** concern about using genetically engineered crop plants.

(1)

(Total for Question 3 = 10 marks)

Organisms and their environment

4 The diagram shows three types of insect collected from trees in a small area of woodland.



(a) (i) Calculate the ratio of beetles to wingless moths.

(2)

ratio .....

(ii) Describe how to estimate the total number of wingless moths in the woodland.

(3)

(b) Female moths release a chemical that can be detected by male moths.

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

(1)

The chemical released by female moths travels through the air to the male moths by

☒ **A** active transport

☒ **B** diffusion

☒ **C** osmosis

☒ **D** transpiration

(ii) This chemical helps male moths to find female moths so that the eggs can be fertilised.

Describe what happens at fertilisation.

(2)

(iii) The cell produced at fertilisation eventually forms a moth made of many different types of cell.

Describe how a single cell can produce many different types of cell.

(2)

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(Total for Question 4 = 10 marks)

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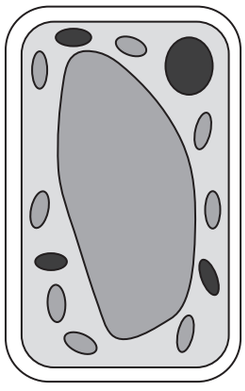
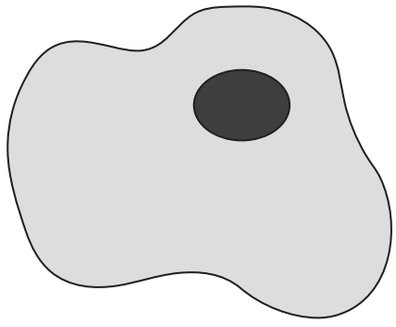
Cells

5 The diagram shows two types of cell.

cell X



cell Y



(a) (i) Explain which cell is from a plant.

(2)

.....

.....

.....

.....

(ii) Aerobic respiration takes place in cell X and in cell Y.

Which is the correct equation for aerobic respiration?

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

(1)

☒ **A** carbon dioxide + water ⟶ glucose + oxygen

☒ **B** oxygen + water ⟶ glucose + carbon dioxide

☒ **C** glucose + oxygen ⟶ water + carbon dioxide

☒ **D** carbon dioxide + glucose ⟶ water + oxygen

(iii) Name the part of the cell where aerobic respiration takes place.

(1)

.....

(b) (i) A light microscope is used to magnify a cell.

The actual width of the cell before it is magnified is 0.02 mm.

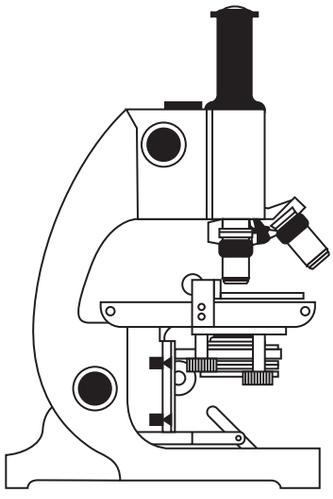
After magnification the width of the image seen is 3 mm.

Calculate the magnification of this cell.

(2)

magnification .....

*(ii) The diagram shows a light microscope.



Describe how the light microscope is used to obtain clear, detailed images of cells.

(6)

(Total for Question 5 = 12 marks)

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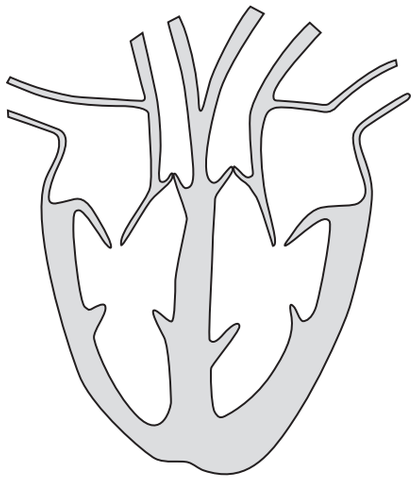
The heart and blood

6 The diagram shows a human heart.



(a) (i) Use a straight line and the letter X to label the left atrium on the diagram.

(1)

(ii) Describe how blood is moved from the right ventricle to the lungs.

(2)

(iii) Which blood vessel transports blood from the lungs to the heart?

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

(1)

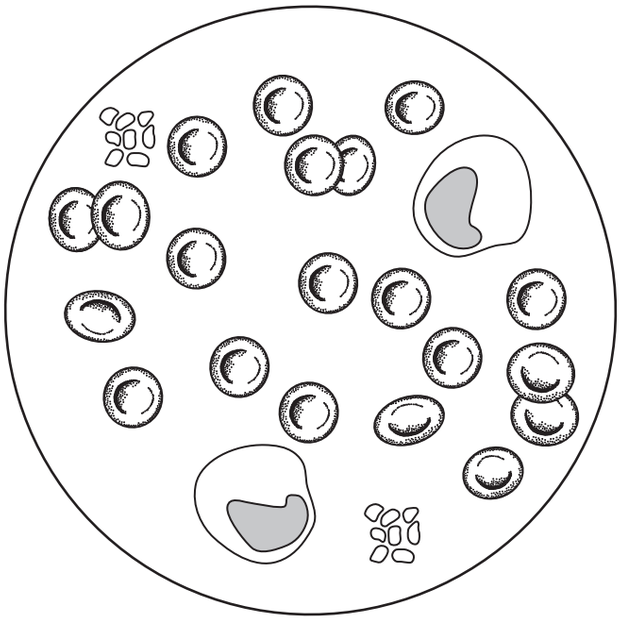
☒ **A** aorta

☒ **B** pulmonary artery

☒ **C** vena cava

☒ **D** pulmonary vein

(b) The diagram shows some components in a sample of blood.



This sample of blood shows a total of 38 components: red blood cells, white blood cells and platelets.

Calculate the percentage of red blood cells in this blood sample.

(2)

..... %

*(c) Describe the functions of red blood cells, white blood cells and platelets.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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