

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 10 June 2016 – Morning

**Time: 1 hour**

Paper Reference

**5BI2F/01**

**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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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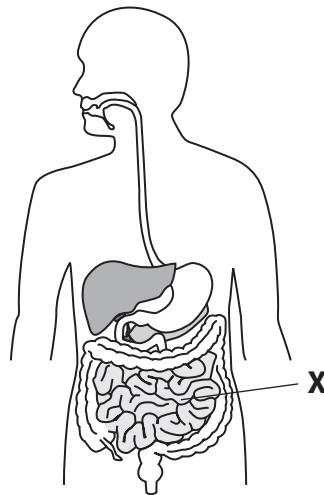
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**Answer ALL questions**

**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 ☒.**

**The digestive system**

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



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

(2)

amino acids	amylase	lipase
fat	protease	simple sugars

Starch is chemically digested by the enzyme .....

This enzyme breaks starch down into .....

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

The part labelled **X** in the diagram is the

(1)

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

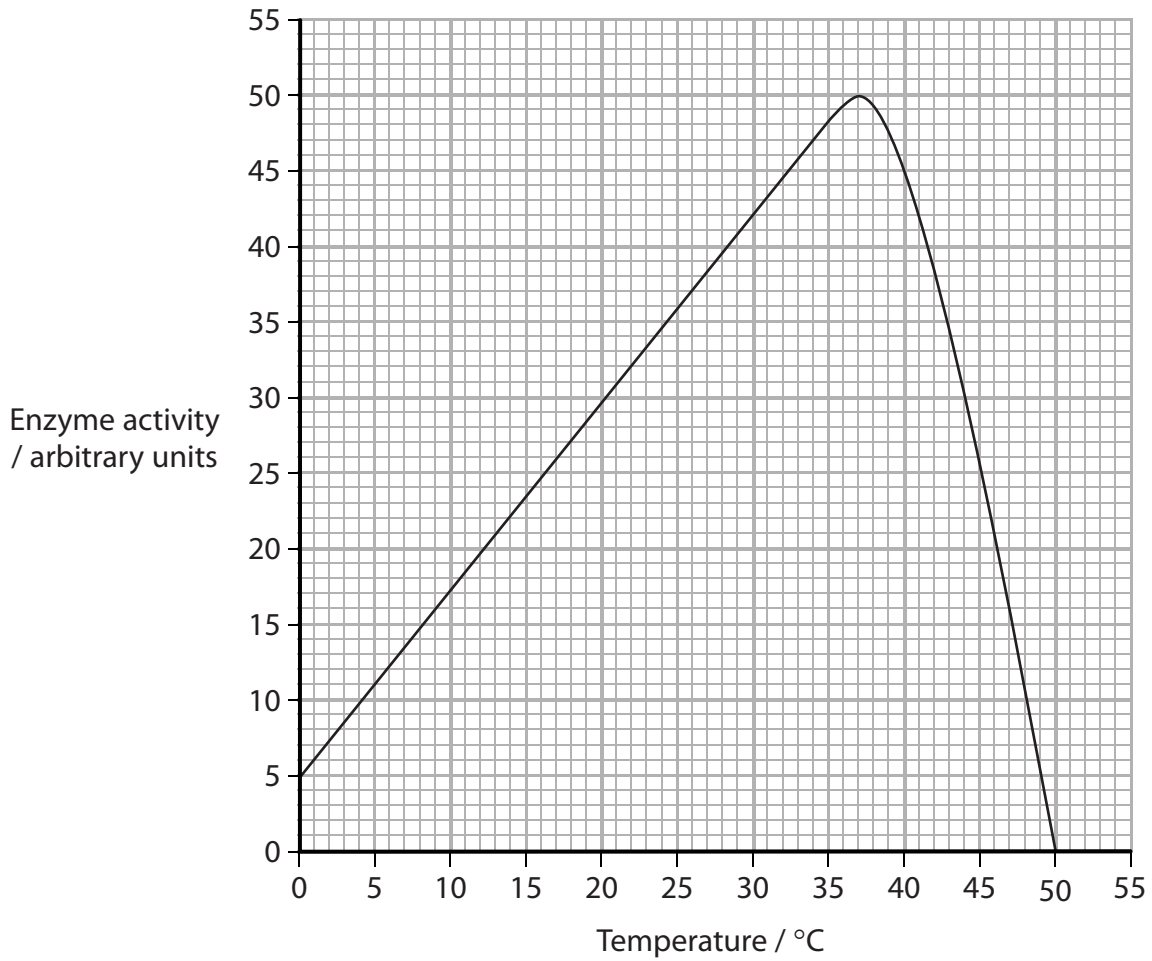
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(b) The effect of temperature on the activity of the enzyme pepsin was investigated.  
The graph shows the results of the investigation.



(i) Describe the enzyme activity from 0°C to 40°C. (2)

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(ii) Explain why the enzyme activity stopped at a temperature of 50°C. (2)

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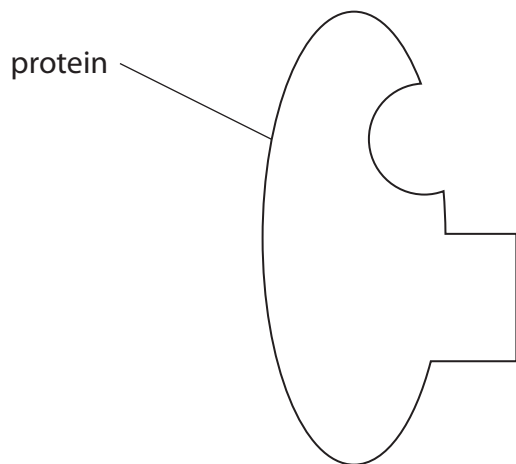
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(c) The lock and key hypothesis explains the complementary shape of enzymes and substrates.

Protein is digested by the enzyme pepsin.

The diagram shows a model of a protein.



Draw the complementary shape of pepsin on the diagram.

(1)

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



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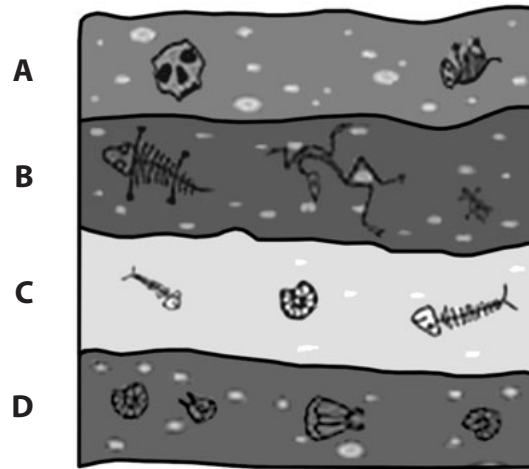
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## Fossils and DNA

2 The diagram shows fossils in different layers of rock.



(a) (i) Which layer of rock is most likely to contain the oldest fossils?

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

- A
- B
- C
- D

(1)

(ii) Use one word from the box to complete the sentence.

replication	probiotics
evolution	osmosis

(1)

The fossil record provides evidence for .....



(iii) Explain why there are gaps in the fossil record for some organisms.

(2)

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(b) Scientists are trying to extract DNA from fossils.

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

The correct pairing of bases in DNA is

(1)

- A C with T
- B T with G
- C G with A
- D A with T

(c) During cloning, DNA is replicated and a single cell divides to form genetically identical cells.

(i) Name the type of cell division that produces genetically identical cells.

(1)

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(ii) Describe the advantages of cloning a mammal.

(2)

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

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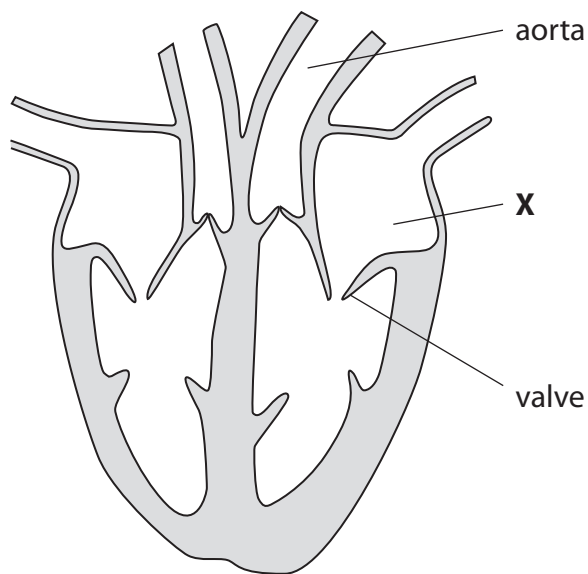
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### The heart and circulation

3 The diagram shows a human heart.



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

The part labelled **X** in the diagram is the

(1)

- A** left atrium
- B** left ventricle
- C** right atrium
- D** right ventricle

(ii) Describe the role of the valve labelled in the diagram.

(2)

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(b) Blood from the left side of the heart travels to different organs of the body.

The table shows the percentage of blood travelling to different organs at rest and during exercise.

organ	percentage of blood (%)	
	at rest	during exercise
brain	19	3
muscles	15	60
skin	9	18
liver	28	7
rest of body	29	12

(i) During exercise the percentage of blood travelling to the skin doubles.

Calculate how many times the percentage of blood travelling to the muscles increases during exercise.

(2)



(ii) Explain why the percentage of blood travelling to the muscles increases during exercise.

(3)

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(c) The word equation shows a process that takes place in muscles during vigorous exercise.



Explain why this process takes place during vigorous exercise.

(2)

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

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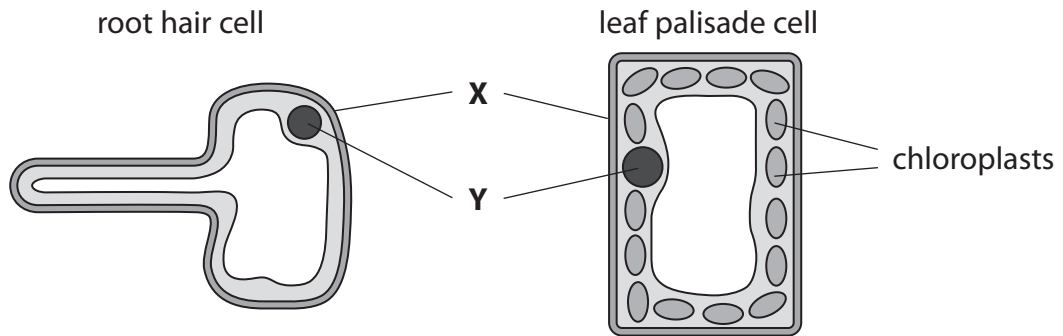
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## Plants

4 The diagrams show a root hair cell and a leaf palisade cell.



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

The part labelled **X** is the

(1)

- A** nucleus
- B** cell wall
- C** cytoplasm
- D** vacuole

(ii) Describe the role of part **Y**.

(2)

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(iii) Draw one straight line from each type of cell to the function of that cell.

(2)

**Type of cell**

**Function**

root hair cell ●

leaf palisade cell ●

● photosynthesis

● transports mineral ions to the leaves

● absorbs water from the soil

● transports sugar to the roots

● prevents transpiration

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(b) The diagram shows one broad bean pod containing five seeds.



The length of each seed in a broad bean pod, from a plant grown in one area of a garden, is shown in the table.

seed number	length / mm
1	14.5
2	20.7
3	17.3
4	12.5
5	10.0

(i) Calculate the mean length of the seeds.

(2)

Mean length = ..... mm

(ii) A pod was taken from a plant grown in a different area of this garden. The mean length of the seeds in this pod is greater.

Suggest reasons why the mean length of these seeds is greater.

(2)

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

Flowering plants produce gametes that combine to form a zygote.

Gametes combine during a process known as

(1)

- A cloning
- B fertilisation
- C meiosis
- D elongation

(Total for Question 4 = 10 marks)



## DNA

5 The diagram shows a section of a DNA molecule.



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

The two scientists who first made an accurate model of DNA were

(1)

- A Crick and Franklin
- B Franklin and Wilkins
- C Wilkins and Watson
- D Watson and Crick

(ii) State the term used to describe the shape of a DNA molecule.

(1)

(b) Some chemicals can cause DNA mutations.

Describe two ways that a DNA molecule is changed by mutation.

(2)

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(c) Explain why an electron microscope is more useful than a light microscope to study the structures inside a cell.

(2)

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\* (d) Describe the advantages and disadvantages of using genetically modified plants.

(6)

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(Total for Question 5 = 12 marks)



### Transport in living things

- 6 Living cells need a constant supply of oxygen and nutrients.  
(a) Describe how oxygen is transported around the body by the blood.

(2)

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(b) (i) Describe how water is transported up the stem and into the leaves of a plant.

(2)

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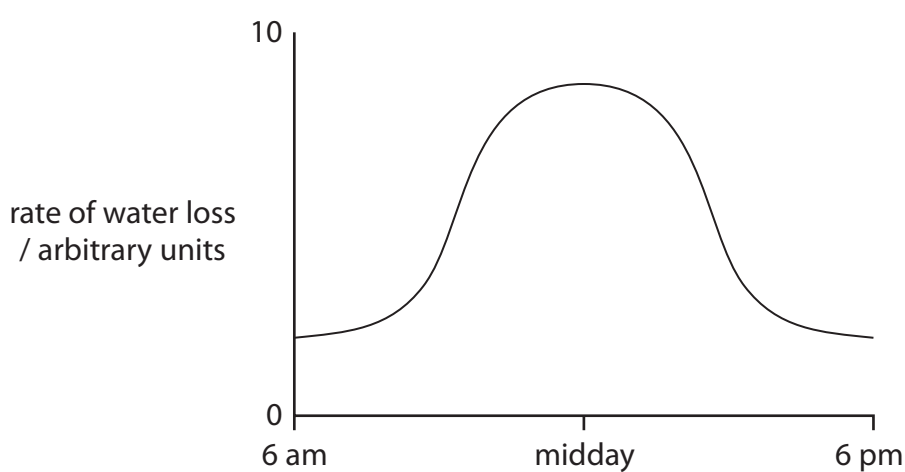
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(ii) The graph shows the rate of water loss from the leaves of a flowering plant during a 12-hour period on one summer's day.



Explain why the rate of water loss changes in the flowering plant from 6 am to midday.

(2)

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\*(c) Describe how sampling techniques can be used to investigate the distribution of plants and insects in a field.

(6)

Area with horizontal dotted lines for writing the answer.

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

**TOTAL FOR PAPER = 60 MARKS**



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