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Cambridge Assessment International Education

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CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

5127917792

BIOLOGY **0610/32**

Paper 3 Theory (Core) **February/March 2025**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **24** pages. Any blank pages are indicated.

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[Turn over

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1 **(a)** Complete the sentences to describe enzymes.

Use words or phrases from the list.

Each word or phrase may be used once, more than once or not at all.

amino acids **calcium** **carbon** **fatty acids** **hydrogen**

iron **magnesium** **molecules** **nitrogen** **oxygen** **water**

Enzymes are proteins. All proteins are made up from a chain of smaller

..... called ..... .

All proteins contain the chemical elements ....., ...

....., ... and ..... .

[4]

(b) Enzymes function as biological catalysts.

Describe what is meant by the term catalyst.

.....

.....

.....

.....

..... [2]

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(c) Fig. 1.1 shows a reaction catalysed by an enzyme.

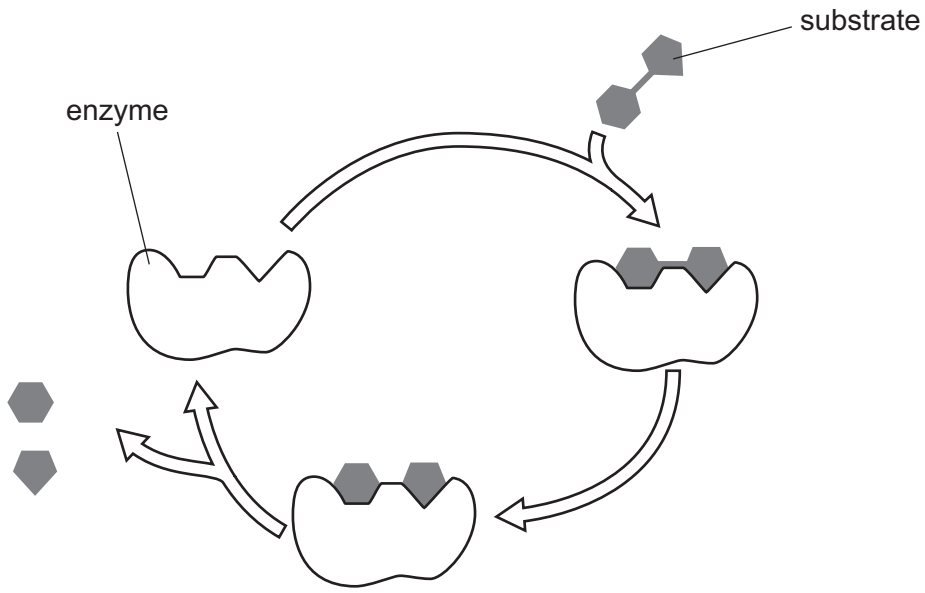

Fig. 1.1

Use Fig. 1.1 to describe enzyme action.

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.....

.....

..... [3]

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(d) Some bacteria are found living in very high temperatures.

Fig. 1.2 shows the effect of temperature on the activity of an enzyme in these bacteria.

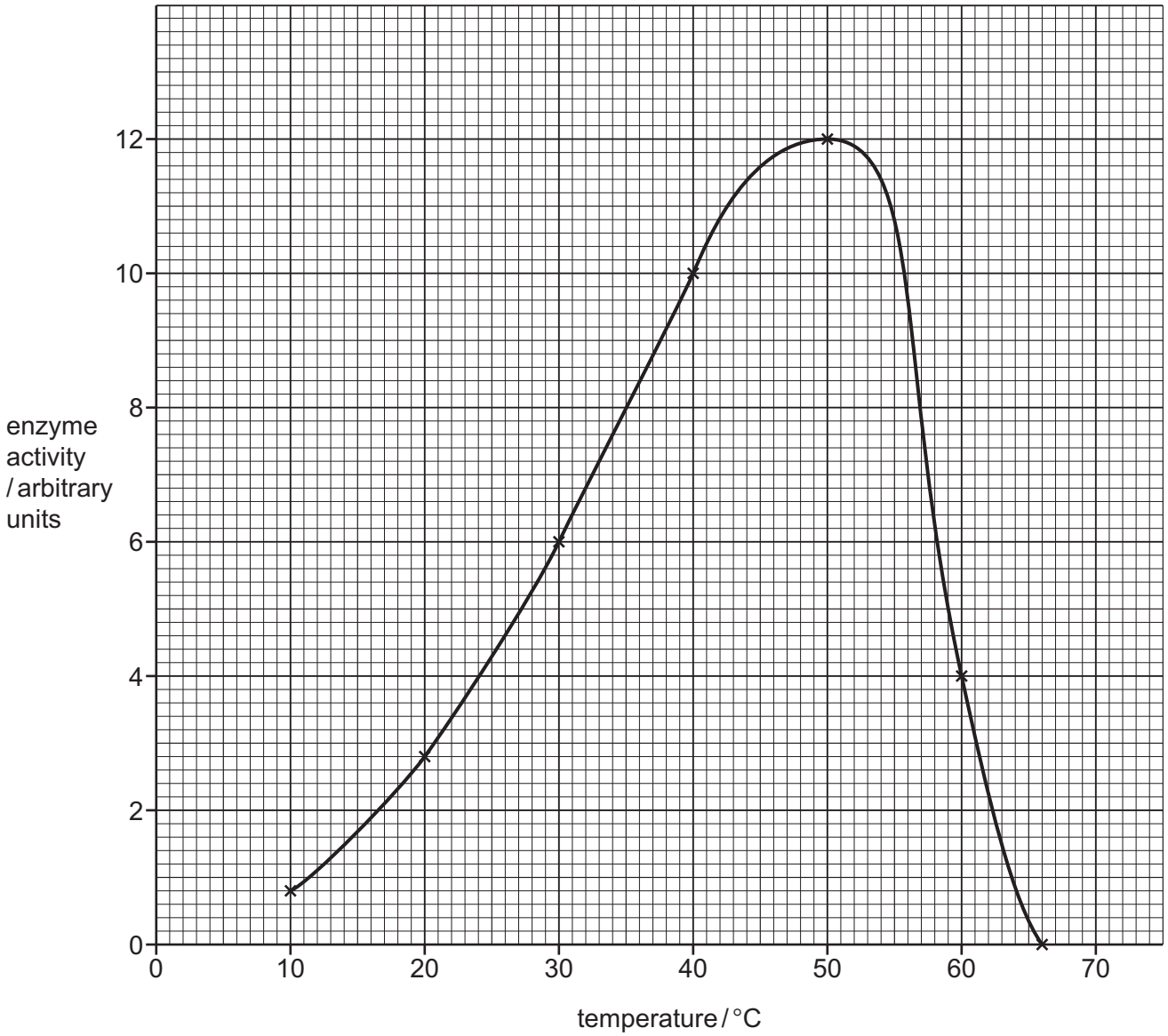

Fig. 1.2

Using the information in Fig.1.2:

(i) Identify the optimum temperature for this enzyme.

..... °C [1]

(ii) Identify the temperature when the enzyme is completely denatured.

Explain how you identified your choice.

temperature ..... °C

explanation .....

.....

.....

[2]

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(iii) Calculate the difference in enzyme activity between 20 °C and 40 °C.

Space for working.

..... arbitrary units [2]

(iv) The mean body temperature for humans is 37 °C.

On Fig. 1.2, sketch the curve for the activity of an enzyme found in humans. [2]

[Total: 16]

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2 **(a)** Fig. 2.1 shows the human digestive system.

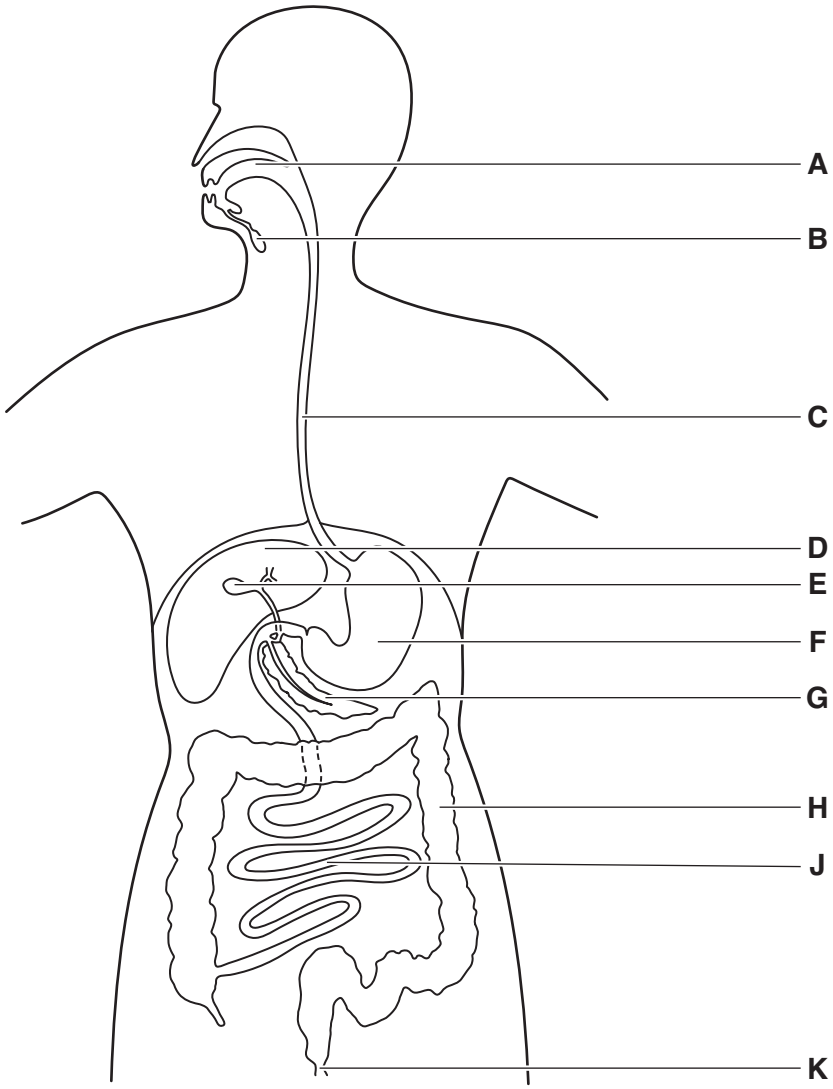

Fig. 2.1

(i) The human digestive system is made up of the alimentary canal and the associated organs.

Food moves through the alimentary canal, but does **not** move through the associated organs.

The pancreas is one of the associated organs.

State the letter in Fig. 2.1 that identifies the pancreas and state the name of **two** enzymes secreted by the pancreas.

letter .....

enzyme 1 .....

enzyme 2 .....

[3]

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(ii) State **one** letter in Fig. 2.1 that identifies **one** other associated organ of the digestive system.

Name this organ.

letter ..... name .....

[1]

(iii) In Fig. 2.1, structure **J** is the small intestine.

State **two** functions of the small intestine.

1 .....

.....

2 .....

.....

[2]

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(b) Some antibiotics are taken into the body as tablets.

Fig. 2.2 shows the concentration of antibiotic in the blood after a tablet is taken.

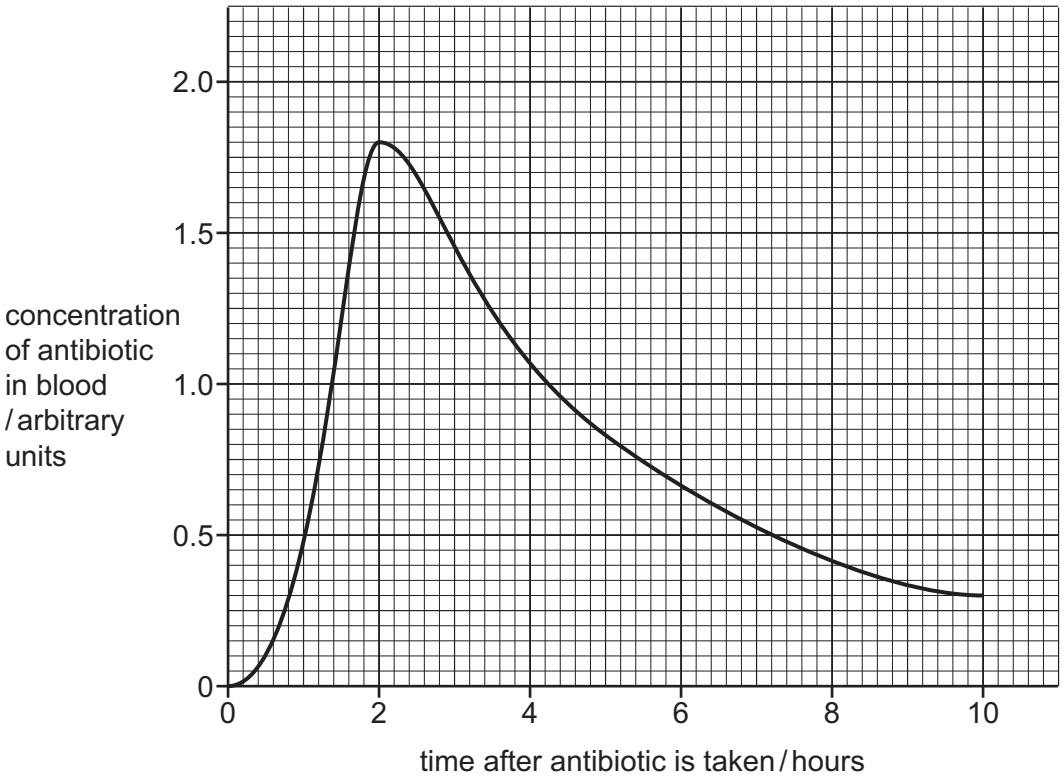

Fig. 2.2

(i) Using Fig. 2.2, describe how the concentration of antibiotic in the blood changes.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Circle the name of the process of taking substances into the body.

assimilation **digestion** **egestion** **excretion** **ingestion** [1]

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(iii) Antibiotics are transported around the body by the blood.

State the name of the component of blood that transports substances such as nutrients, hormones and antibiotics.

..... [1]

(iv) State the type of organism killed by antibiotics.

..... [1]

[Total: 12]

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3 **(a)** Fig. 3.1 shows blood flow through a human heart.

The arrows show the direction of blood flow.

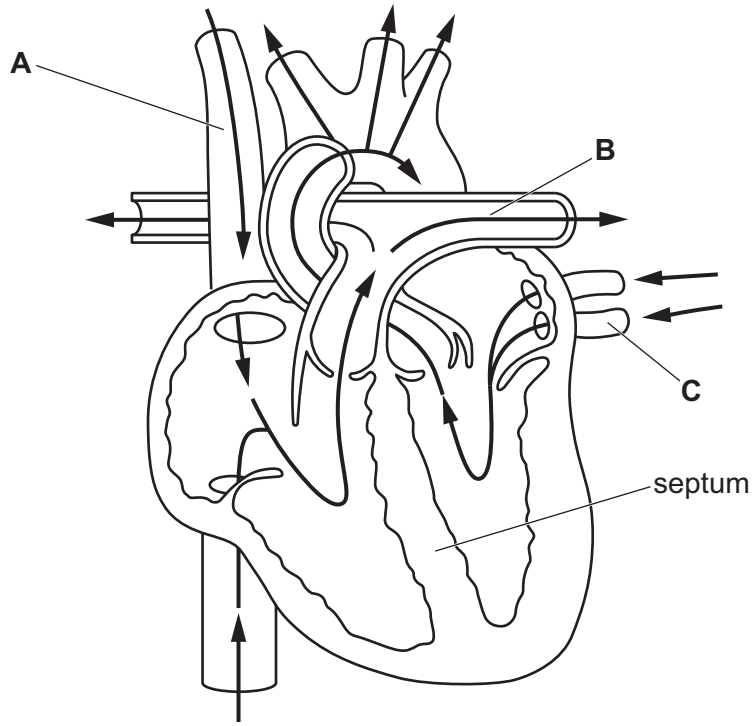

Fig. 3.1

(i) On Fig. 3.1, draw a label line and the letter **X** to identify the muscular wall of the left ventricle. [1]

(ii) Describe the path taken by blood as it moves from **A** to **B** in Fig. 3.1.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) State the name of blood vessel **C** shown in Fig. 3.1.

..... [1]

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(b) The activity of the heart can be monitored using an ECG.

Fig. 3.2 shows the results of an ECG for a person who has been resting for 15 minutes.

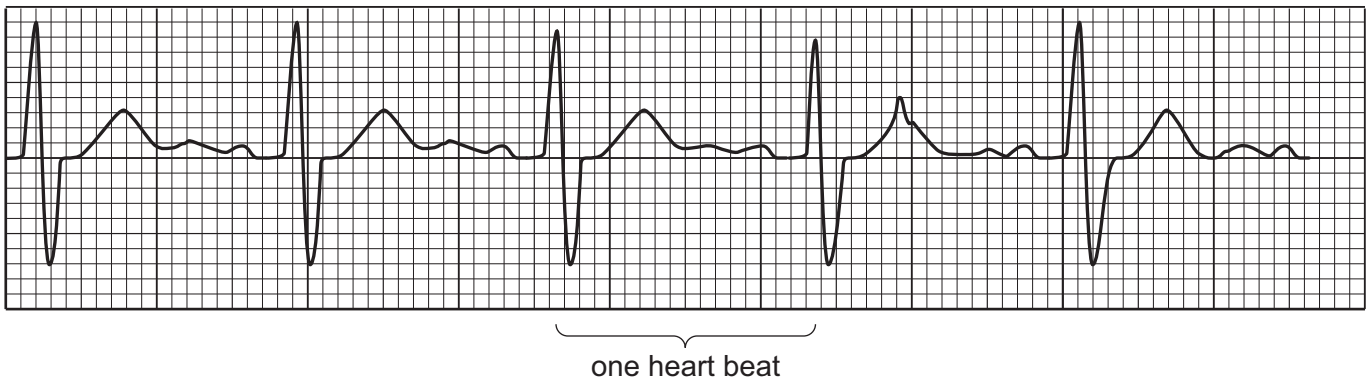

Fig. 3.2

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Fig. 3.3 shows the results of ECGs for the same person:

- resting
- during vigorous physical activity
- one minute after physical activity
- one hour after physical activity.

(i) Draw lines to link each activity with its ECG. Draw **three** lines.

One has been done for you.

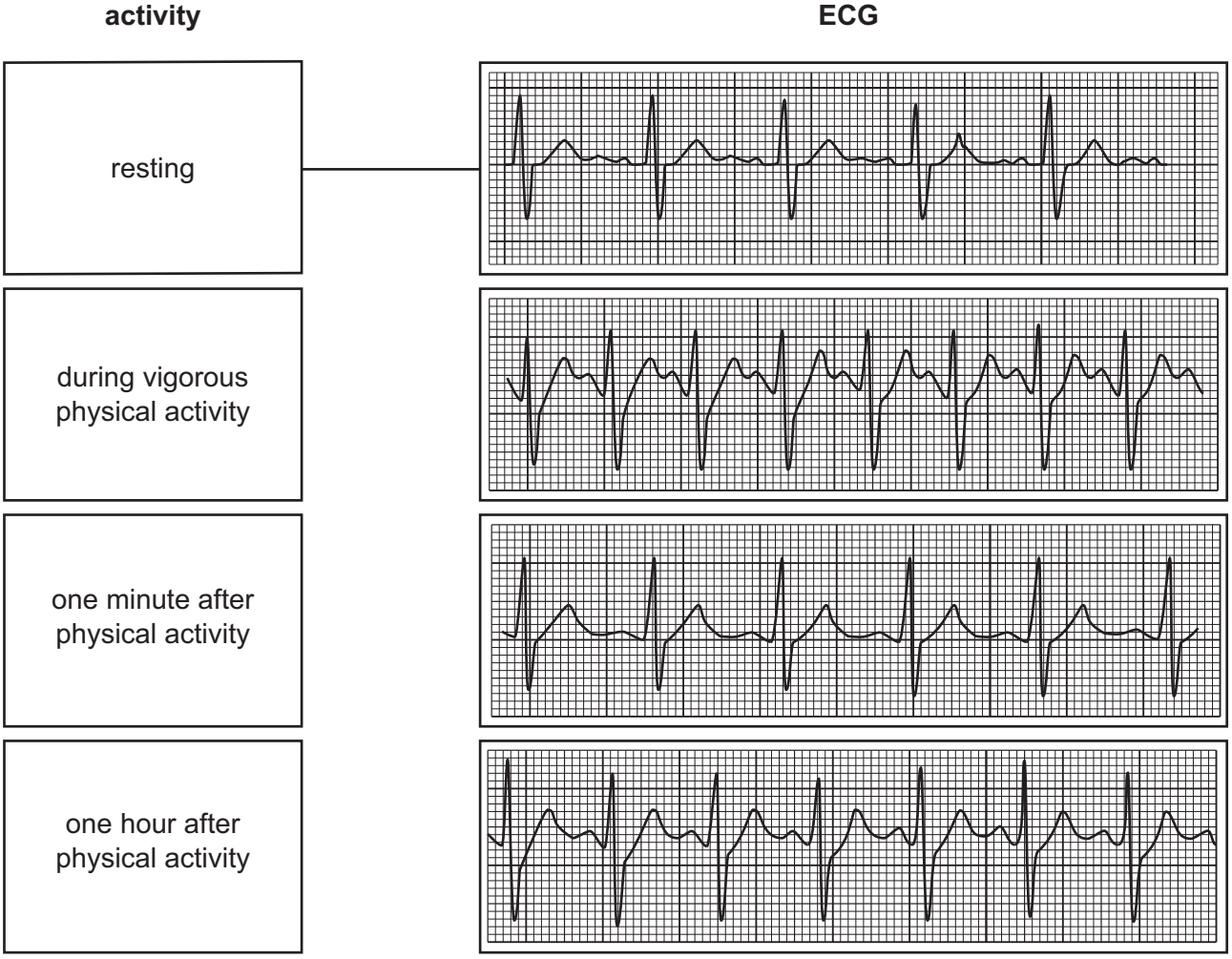

Fig. 3.3

[2]

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(ii) State **two** other ways that the activity of the heart can be monitored.

1 .....

.....

2 .....

.....

[2]

(c) During vigorous physical activity humans respire anaerobically.

(i) Tick (✓) **three** statements that describe anaerobic respiration in humans.

alcohol is produced	
carbon dioxide is produced	
glucose is required	
lactic acid is produced	
oxygen is required	
releases less energy per substrate molecule than aerobic respiration	

[3]

(ii) State how vigorous exercise affects the rate and depth of breathing.

rate .....

.....

depth .....

.....

[1]

[Total: 13]

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4 Fig. 4.1 shows part of a leaf from a Mexican hat plant.

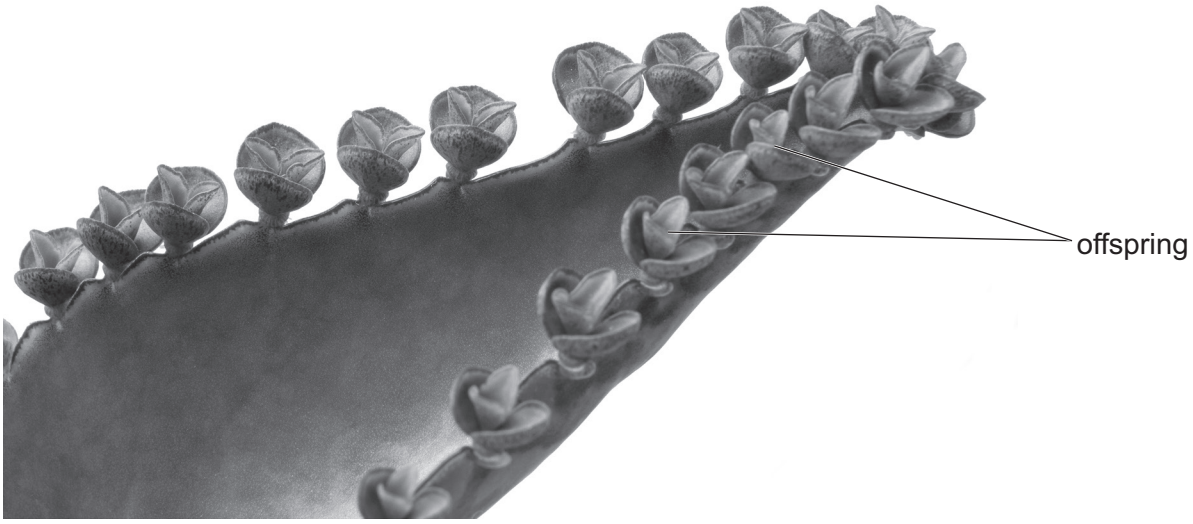

Fig. 4.1

(a) The Mexican hat plant shown in Fig. 4.1 is reproducing.

Tick (✓) **three** statements that describe the reproduction shown in Fig. 4.1.

Gametes are produced.	
Involves implantation.	
Only one parent is involved.	
Pollination occurs before the stage shown in Fig. 4.1.	
The offspring are genetically identical to each other.	
The reproduction is asexual.	

[3]

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(b) Fig. 4.2 shows a section of a flower.

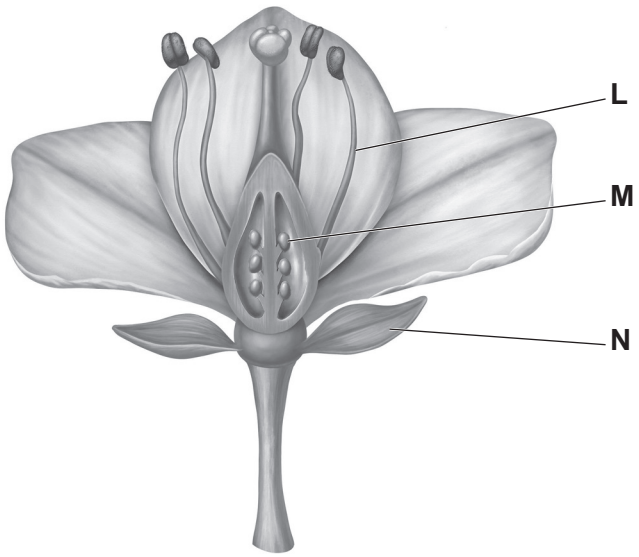

Fig. 4.2

Identify structures **L**, **M** and **N** shown in Fig. 4.2.

L .....

M .....

N .....

[3]

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(c) Fig. 4.3 shows a flower from a Crocus plant.

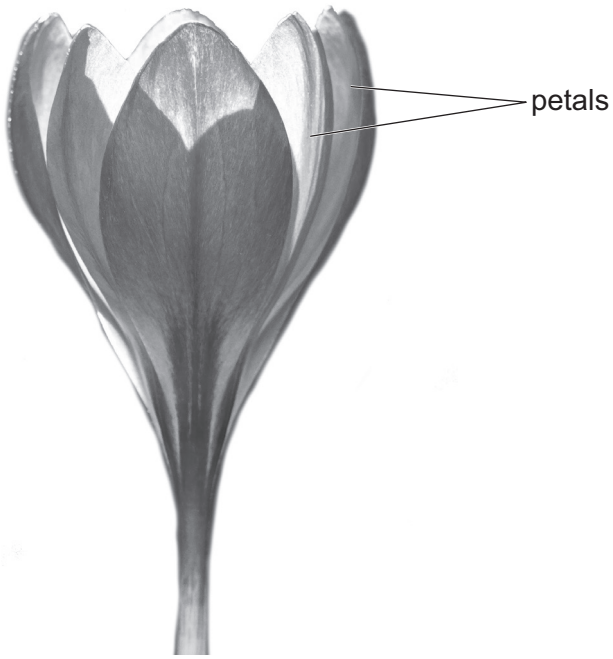

Fig. 4.3

(i) Using the information in Fig. 4.3, predict the type of pollination used by the Crocus plant.

Explain your prediction.

prediction .....

explanation .....

.....

.....

.....

.....

[3]

(ii) Describe the process of pollination.

.....

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.....

..... [2]

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(d) Fig. 4.4 is a photomicrograph of pollen grains.

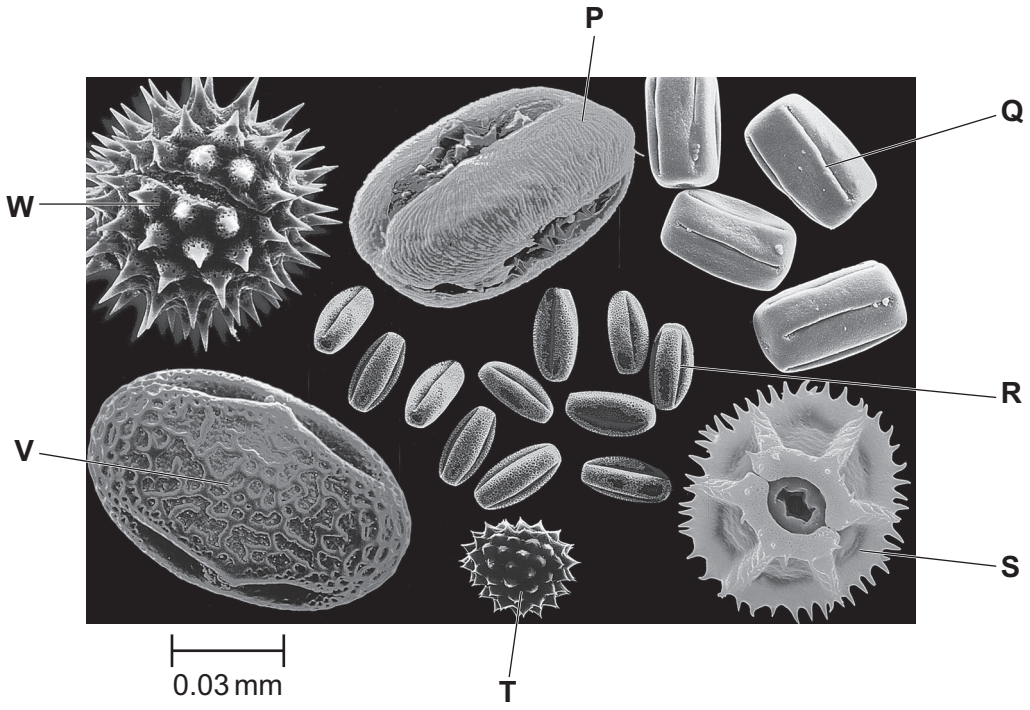

Fig. 4.4

(i) State **one** letter in Fig. 4.4 that identifies a pollen grain from a wind-pollinated flower.

..... [1]

(ii) Using the information in Fig. 4.4, estimate the maximum length of pollen grain **V**.

Include the unit.

..... unit ..... [2]

(iii) State **two** characteristics of pollen grains from insect-pollinated flowers.

1 .....

.....

2 .....

.....

[2]

[Total: 16]

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5 **(a)** Fig. 5.1 shows a leaf insect on a leaf.



Fig. 5.1

(i) State **one** feature **visible** in Fig. 5.1 that identifies this leaf insect as an insect.

..... [1]

(ii) State **one** feature **visible** in Fig. 5.1 that identifies this leaf insect as an arthropod.

..... [1]

(b) The leaf insect in Fig. 5.1 has adaptive features.

(i) Describe the adaptive features **visible** in the insect shown in Fig. 5.1, and explain the importance of these features.

.....

.....

.....

.....

.....

.....

..... [3]

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(ii) Complete the sentences by writing a suitable word in each space.

In a population of leaf insects there are differences between the individuals. The term for the difference between individuals of the same species is ..... . Individuals that reproduce are able to pass on their ..... to the next generation. Over many generations the features of individuals that reproduce will be more common in the population. This process is called ..... selection.

[3]

(c) Some species of leaf insect are endangered.

State **three** ways that endangered species can be conserved.

1 .....

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2 .....

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3 .....

.....

[3]

[Total: 11]

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6 **(a)** Barley is a crop plant.

Fig. 6.1 shows the yield of barley per unit area of crops grown between 1945 and 2020.

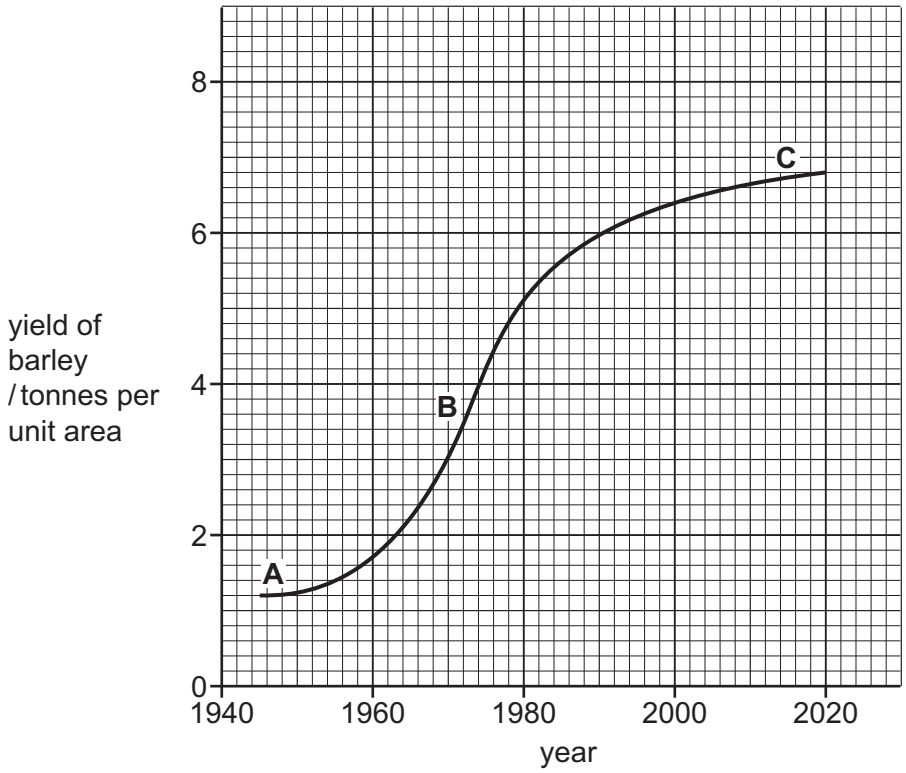

Fig. 6.1

(i) Selective breeding of barley plants has increased the yield of barley.

Identify the period, **A**, **B** or **C**, when the largest increase in yield occurred.

Explain how you made your choice.

period .....

explanation .....

.....

[2]

(ii) Using the information in Fig. 6.1, calculate the yield of barley in the year 2000 in kilograms per unit area.

One tonne = 1000 kg.

Space for working.

..... kg [2]

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(iii) The list contains statements that describe selective breeding of barley plants to increase yield.

A Humans select barley plants with a high yield.

B New barley plants are grown.

C Offspring with a high yield are selected and bred together.

D Pollination and fertilisation occurs.

E Seeds form.

F The process is repeated over many generations.

Arrange the statements in the correct order to describe the process of selective breeding in barley plants.

Two have been done for you.

A			**B**		

[2]

(iv) State **three** other ways that humans can increase the yield of barley.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

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(b) Barley can be grown as a monoculture.

(i) Describe what is meant by the term monoculture.

.....

..... [1]

(ii) State **one** advantage and **one** disadvantage of growing crops as monocultures.

advantage .....

.....

disadvantage .....

..... [2]

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