Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/32**

Paper 3 Theory (Core) **February/March 2022**

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 **20** pages. Any blank pages are indicated.

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1 Fig. 1.1 is a photomicrograph of an animal cell.

.....

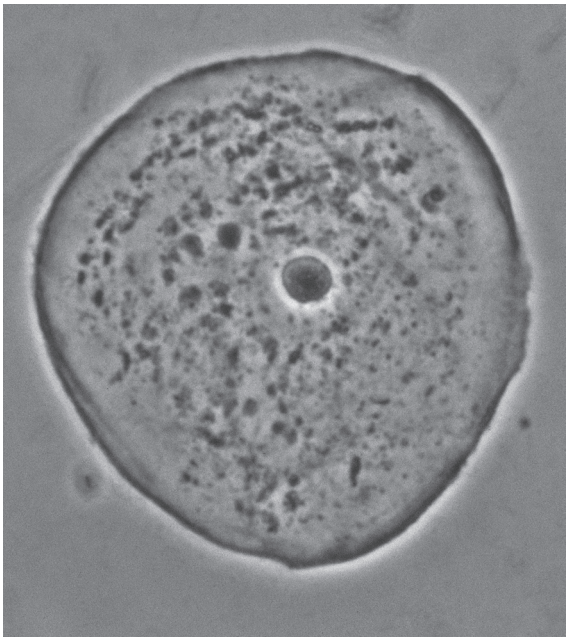

Fig. 1.1

(a) Identify the structure in the cell that contains the genetic material.

Label this structure on Fig. 1.1 by stating its name in the space provided **and** by drawing a label line to show its location in the cell. [2]

(b) The actual size of the animal cell is much smaller than it appears in the image in Fig. 1.1.

State the piece of laboratory equipment that is used to view animal cells.

..... [1]

(c) Plants contain additional cell structures when compared to animal cells.

State **two** structures of plant cells that are **not** present in the cell shown in Fig. 1.1.

1 .....

2 .....
[2]

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(d) Fig. 1.2 is a diagram representing the concentration of oxygen inside and outside an animal cell.

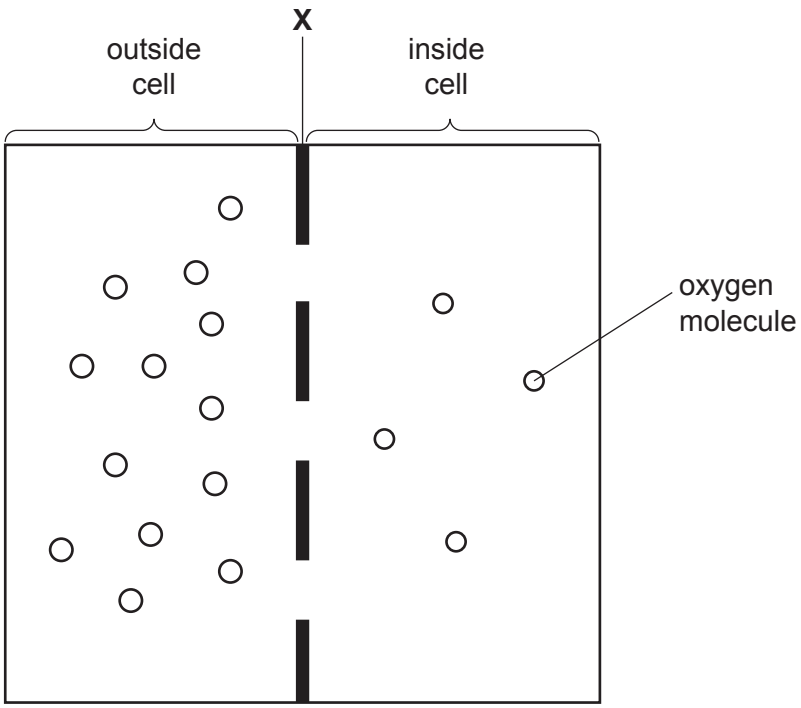

Fig. 1.2

(i) State the name of the part of the cell that **X** represents.

..... [1]

(ii) Draw an arrow **on Fig. 1.2** to show the net direction of movement of the oxygen molecules. [1]

(iii) State the name of the process represented by the arrow you have drawn on Fig. 1.2.

..... [1]

[Total: 8]

2 **(a)** Fig. 2.1 is a diagram of the male reproductive system in humans.

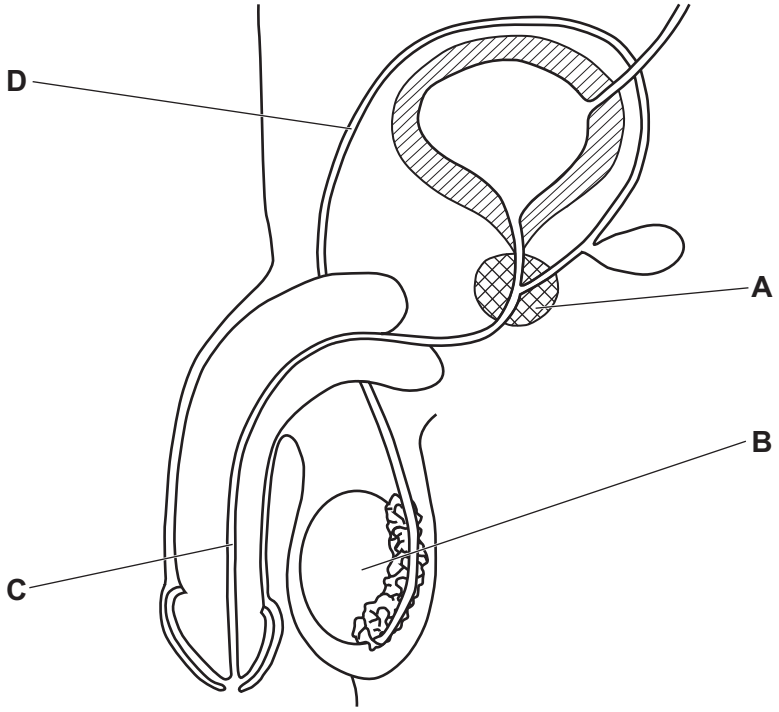

Fig. 2.1

The boxes on the left show the letters in Fig. 2.1 that identify parts of the male reproductive system.

The boxes on the right show the functions of some of the parts.

Draw **four** straight lines to match each letter to its correct function.

letter in Fig. 2.1	**function**
	produces sperm
A	
	sac which contains the testes
B	
	secretes fluid for sperm to swim in
C	
	tube which carries the sperm to the urethra
D	
	tube which carries urine and sperm

[4]

(b) The testes are organs that produce a hormone that controls the development of secondary sexual characteristics in males.

(i) Draw a (circle) around the name of this hormone.

adrenaline **insulin** **oestrogen** **testosterone**

[1]

(ii) Explain why the testes are classified as organs.

.....

.....

.....

.....

..... [2]

(c) Reproduction is one of the characteristics of living things.

State **two** other characteristics.

1 .....

2 .....

[2]

(d) Describe how sexual reproduction differs from asexual reproduction.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 12]

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3 **(a)** Fig. 3.1 is a diagram of a section through a human heart.

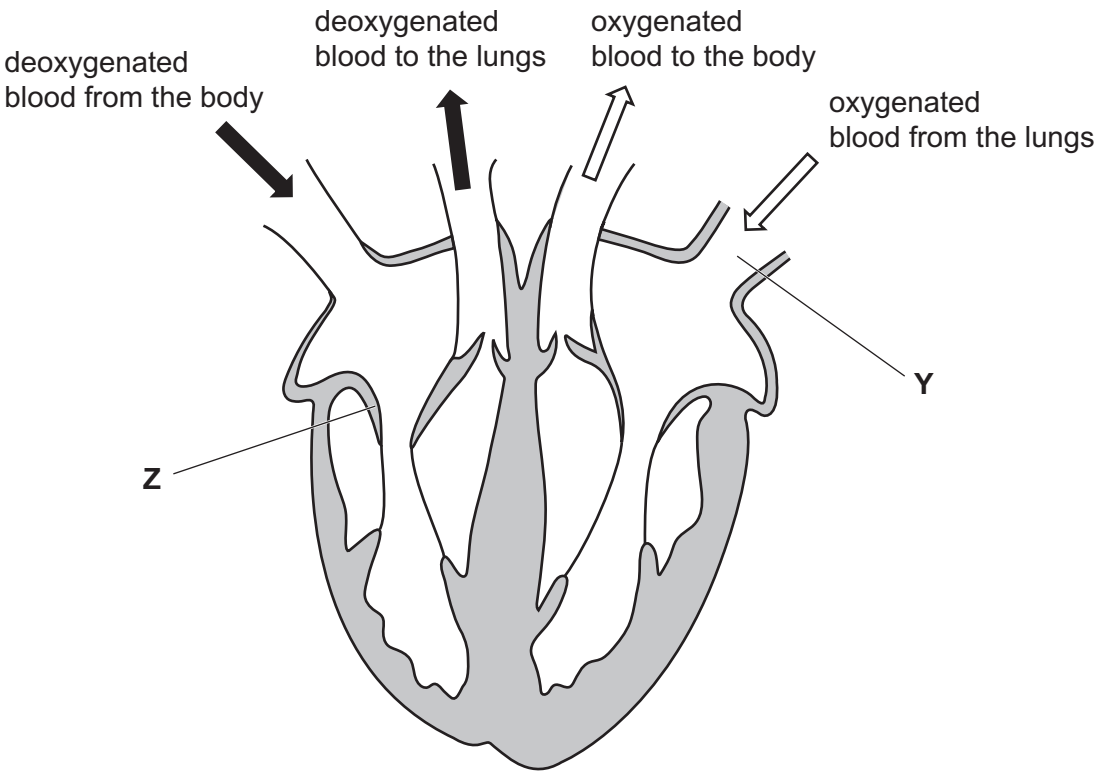

Fig. 3.1

(i) Draw the letter **X** on Fig. 3.1 to show the position of the septum. [1]

(ii) State the name of the blood vessel labelled **Y** in Fig. 3.1.

..... [1]

(iii) State the function of the part labelled **Z** in Fig. 3.1.

.....

.....

..... [1]

(iv) State how the part labelled **Z** in Fig. 3.1 can be used to monitor the activity of the heart.

.....

.....

..... [1]

(v) State the name of the main type of tissue that forms the wall of the heart.

..... [1]

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(b) A scientist measured the average resting heart rate of seven different species of animal. They also estimated the average life expectancy of each species.

Fig. 3.2 is a graph of the scientist's data.

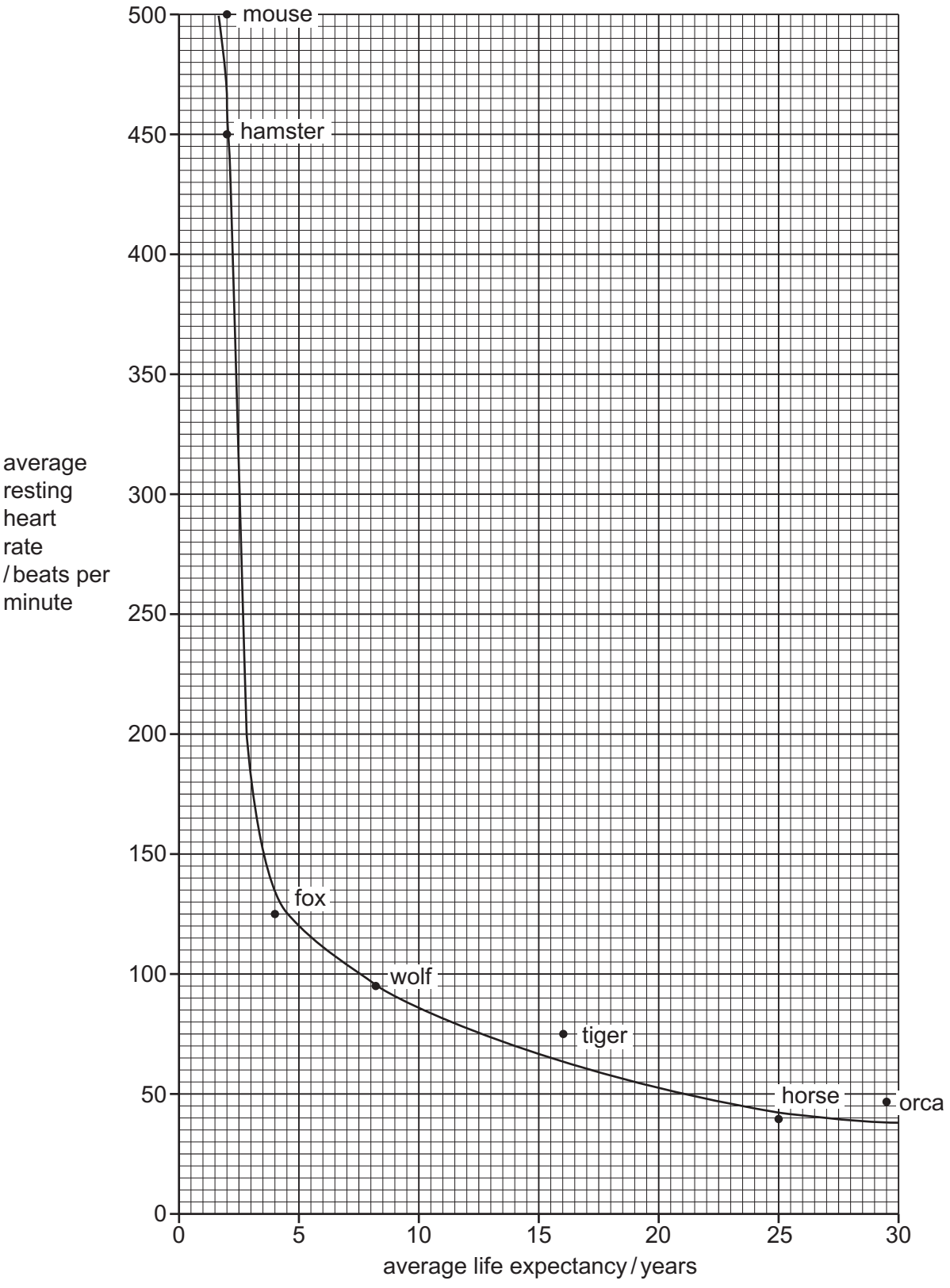

Fig. 3.2

(i) Complete the sentences to describe the results in Fig. 3.2.

The animal with the highest average resting heart rate is the ..... .

The animal with the longest average life expectancy is the ..... .

The general trend is that as the average life expectancy increases, the average resting heart rate ..... .

[3]

(ii) Another animal species has an average life expectancy of 14 years.

Using the information in Fig. 3.2, predict the average resting heart rate of this animal species.

..... beats per minute [1]

(c) Coronary heart disease (CHD) is a blockage of one of the blood vessels of the heart.

(i) State the name of the blood vessel that becomes blocked in CHD.

..... [1]

(ii) List **two** risk factors for coronary heart disease.

1 .....

2 .....

[2]

(iii) List the names of **two** types of cell found in blood.

1 .....

2 .....

[2]

[Total: 14]

4 **(a)** A student investigated aerobic respiration in an arthropod.

Fig. 4.1 shows the apparatus the student used.

The potassium hydroxide solution removed any carbon dioxide produced by the arthropod.

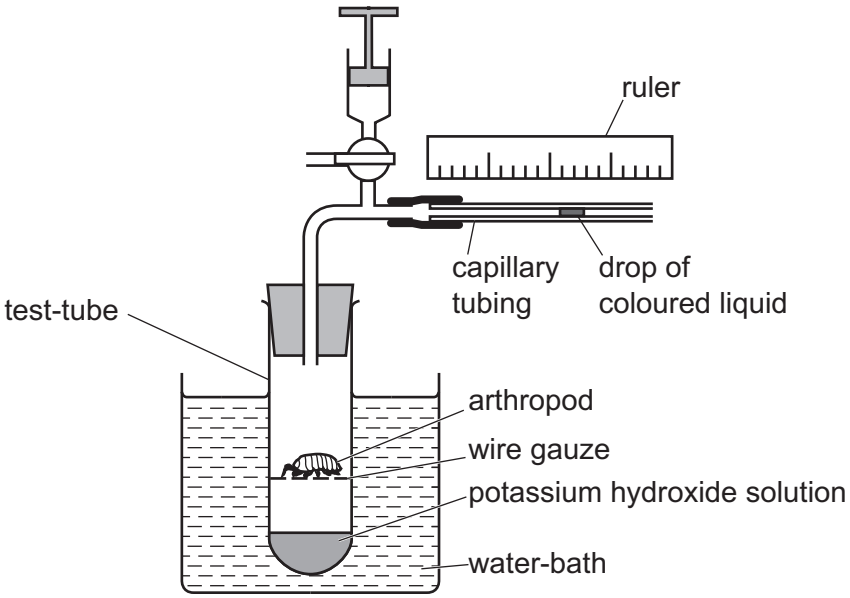

Fig. 4.1

The coloured liquid moved 9 mm in 30 seconds.

(i) Calculate the rate of movement of the coloured liquid.

..... mm per s [1]

(ii) Predict the distance moved by the coloured liquid in one minute.

..... mm [1]

(iii) State the name of the gas taken in by the arthropod that caused the coloured liquid to move towards the test-tube.

..... [1]

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(iv) Tick (✓) **one** sentence that explains why a water-bath was used in the investigation shown in Fig. 4.1.

Water is needed for respiration.	
Water is needed for germination.	
Water is used to keep the temperature constant.	
Water is used to keep the pH constant.	

[1]

(b) Carbon dioxide is one product released by aerobic respiration.

(i) State the name of the other product of aerobic respiration.

..... [1]

(ii) State the name of the organ in humans that excretes carbon dioxide.

..... [1]

(c) Respiration releases the energy needed for body processes.

Complete the sentences to describe some of the ways energy is used by the body.

Energy is required for muscle ..... . This allows our bodies to move.

Energy is also required for the passage of nerve ..... . These are electrical signals that are passed along cells called ..... .

[3]

[Total: 9]

5 **(a)** Fig. 5.1 is a drawing of part of a cross-section of a leaf.

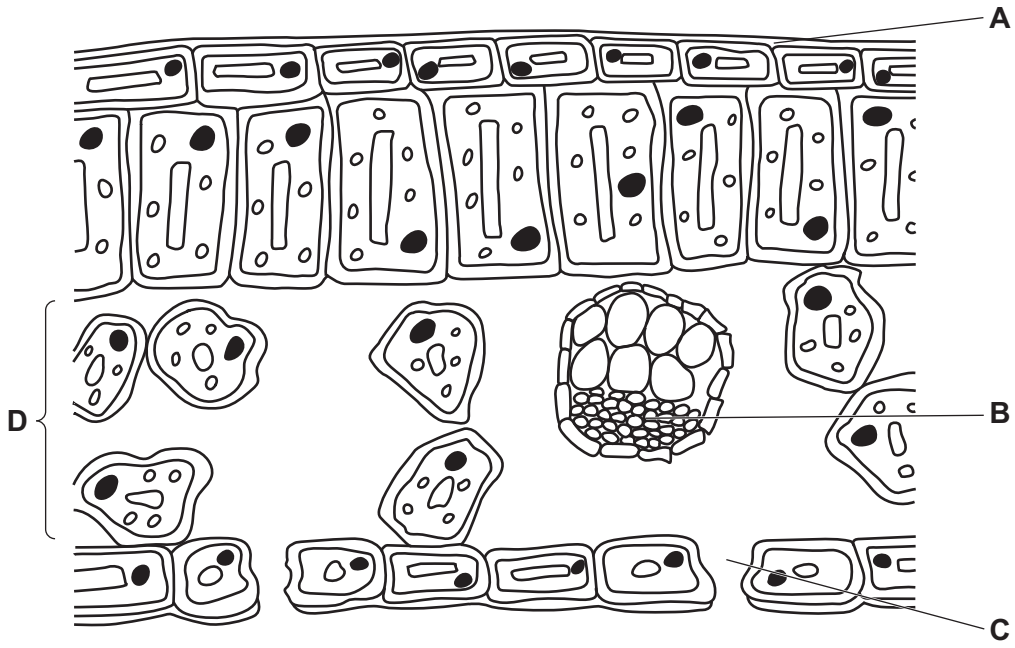

Fig. 5.1

(i) Complete Table 5.1 by stating the names of the parts labelled in Fig. 5.1.

Table 5.1

letter in Fig. 5.1	name of the part
A	
B	
C	
D	

[4]

(ii) State the number of guard cells shown in Fig. 5.1.

..... [1]

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(b) The xylem is responsible for transporting water through the plant.

(i) State **one** other substance transported by the xylem.

..... [1]

(ii) State the type of cell through which water enters a plant.

..... [1]

(iii) Describe how water moves out of the leaves of a plant.

.....

.....

.....

.....

.....

.....

..... [3]

(c) (i) State the word equation for photosynthesis.

..... [2]

(ii) State the type of energy required for photosynthesis.

..... [1]

[Total: 13]

6 **(a)** A researcher investigated the effect of temperature on two different biological washing powders, **A** and **B**.

Two identical pieces of clothing were stained with the same type of food.

The researcher timed how long each washing powder took to remove the stains, at different temperatures.

Fig. 6.1 is a graph of the results.

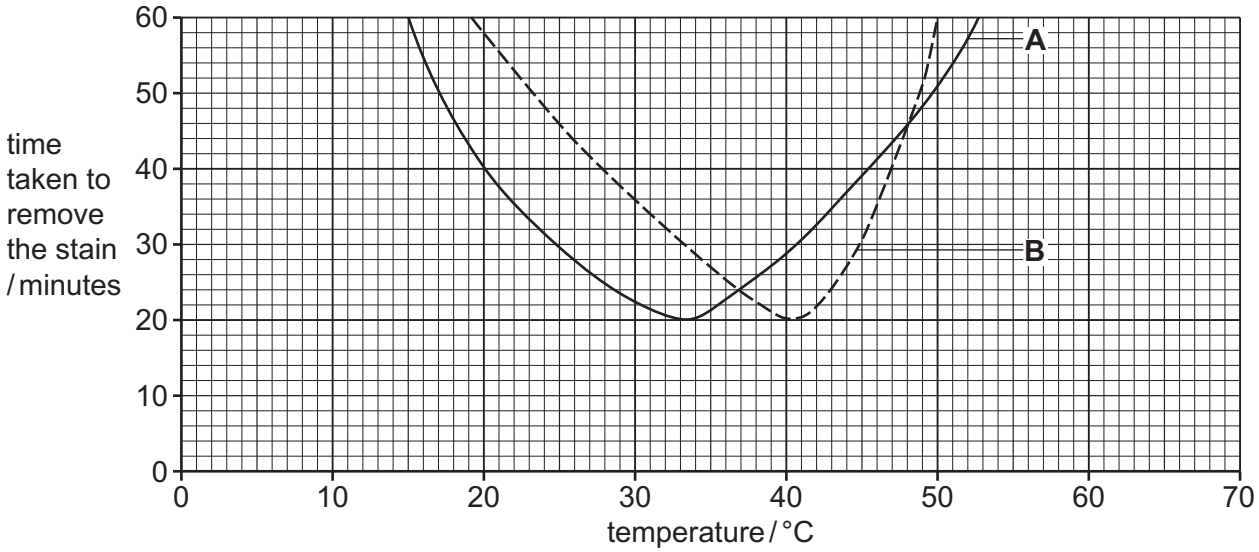

Fig. 6.1

(i) Determine the time taken for washing powder **A** to remove the stain at 20 °C.

..... minutes [1]

(ii) State why 40 °C is the best temperature to use for washing powder **B**.

.....

.....

..... [1]

(iii) A student stated some conclusions for the results shown in Fig. 6.1.

Tick (✓) **two** boxes that show two correct conclusions for the results shown in Fig. 6.1.

Washing powder **B** is active over a greater range of temperatures than washing powder **A**.	
Washing powders **A** and **B** do **not** work at 50 °C.	
Washing powders **A** and **B** have the same activity at 37 °C.	
Washing powder **A** can remove the stain in 15 minutes.	
Washing powder **A** is more effective at lower temperatures than washing powder **B**.	

[2]

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(b) State **one** factor, other than temperature, that affects enzyme activity.

..... [1]

(c) Enzymes are biological catalysts.

Define the term catalyst.

.....

.....

..... [2]

(d) Fig. 6.2 is a diagram showing the action of an enzyme.

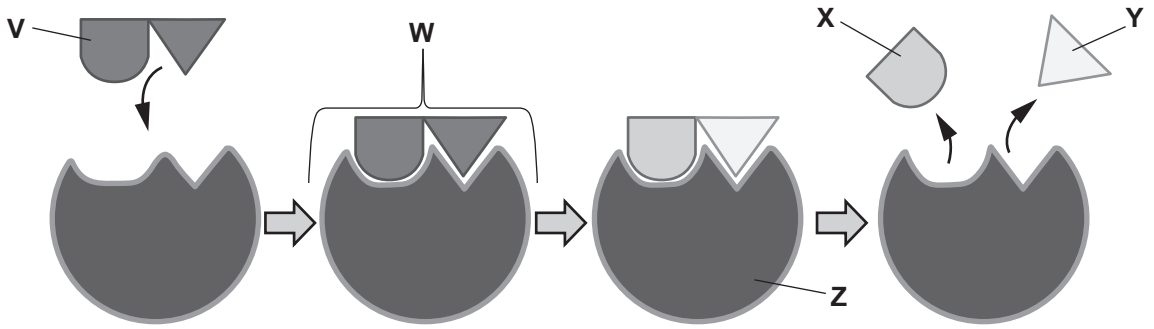

Fig. 6.2

State the letter or letters from Fig. 6.2 that represent the:

substrate .....

enzyme .....

[2]

(e) Lipase is an enzyme commonly found in washing powder.

Complete the word equation for the reaction that involves the enzyme lipase.

..... $\xrightarrow{\text{lipase}}$ ..... + glycerol

[2]

[Total: 11]

7 **(a)** Scientists recorded the percentage of endangered species in each of the five groups of vertebrates, in 2000 and 2011.

Fig. 7.1 shows the results.

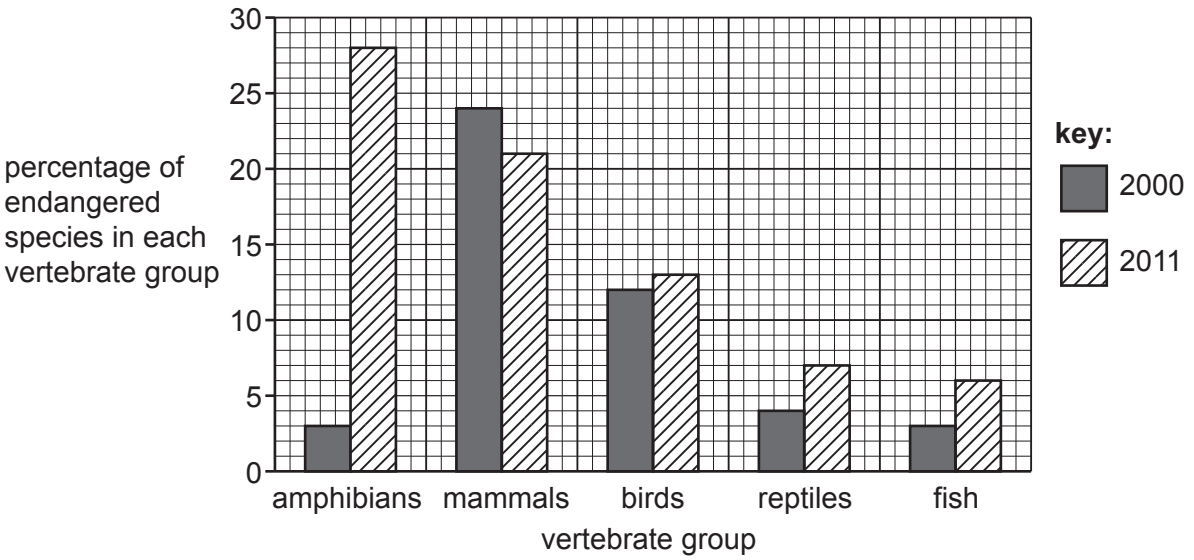

Fig. 7.1

(i) State the vertebrate group that had the largest increase in the percentage of endangered species between 2000 and 2011.

..... [1]

(ii) State the vertebrate group that had a decrease in the percentage of endangered species.

..... [1]

(iii) State the percentage of fish species that were endangered in 2011.

..... % [1]

(b) State **one** feature of birds which distinguishes them from the other groups of vertebrates.

..... [1]

(c) One reason species become endangered is pollution from discarded waste such as plastic.

Describe **two** ways of preventing plastic waste entering the environment.

1 .....

.....

2 .....

.....

[2]

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(d) Reducing pollution can help to conserve species.

Outline **other** ways that can be used to conserve endangered animal species.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(e) Differences between the features of the five groups of vertebrates have arisen over very long periods of time. These differences are the result of natural selection.

The box on the left contains the term 'Natural selection'.

The boxes on the right contain some sentence endings.

Draw **three** lines to link the term 'Natural selection' with three sentence endings to make three correct sentences.

Natural selection	involves humans choosing the best animals.
	involves only the best adapted organisms surviving and breeding.
	involves passing on alleles to offspring.
	occurs because all offspring are identical to their parents.
	occurs as there are not enough resources for every individual.
	only occurs in animals.

[3]

[Total: 13]

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