



General Certificate of Secondary Education  
2024

Centre Number

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Candidate Number

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# Biology

Unit 2

Foundation Tier



[GBL21]

\*GBL21\*

**TUESDAY 11 JUNE, MORNING**

## TIME

1 hour 30 minutes.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page or on blank pages.**

Complete in black ink only. **Do not write with a gel pen.**

Answer **all twelve** questions.

## INFORMATION FOR CANDIDATES

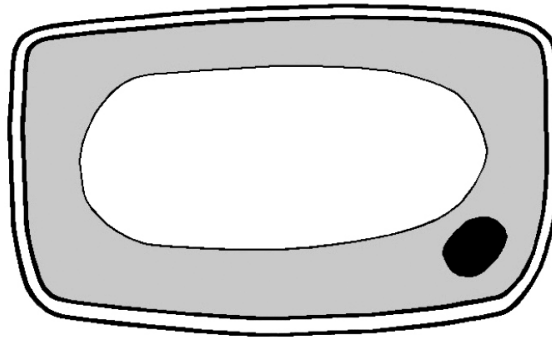
The total mark for this paper is 90.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **10(b)**.



- 1 The diagram shows the effect of osmosis on a plant cell which had been left in water for one hour.



Source: Chief Examiner

Look at the diagram.

Choose words from the box to complete the sentences which describe osmosis and its effect on this plant cell.

|              |             |             |       |
|--------------|-------------|-------------|-------|
| fully        | dilute      | plasmolysed |       |
| membrane     | water       | wall        | sugar |
| concentrated | selectively | turgid      |       |

- Osmosis is the movement of \_\_\_\_\_ molecules from a \_\_\_\_\_ solution to a \_\_\_\_\_ solution through a \_\_\_\_\_ permeable membrane.
- The cell \_\_\_\_\_ stops the plant cell from bursting.
- After one hour in water, the plant cell becomes \_\_\_\_\_. [6]



2 Some blood vessels transport blood to organs.

(a) Draw a straight line to link each blood vessel to the correct organ.

| Blood vessel     | Organ  |
|------------------|--------|
| vena cava        | liver  |
| renal artery     | heart  |
| pulmonary artery | kidney |
| hepatic artery   | lungs  |

[3]

The human circulatory system is described as a double circulation.

(b) What is a double circulation?

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[2]

[Turn over



- 3 The table shows how the body mass of males and females may affect their risk of developing Type 2 diabetes.

| Body mass      | Risk of developing Type 2 diabetes / % |         |
|----------------|--|---------|
|                | Males                                  | Females |
| underweight    | 10                                     | 6       |
| healthy weight | 17                                     | 19      |
| overweight     | 32                                     | 29      |
| obese          | 51                                     | 55      |

Source: "Effect of BMI on lifetime risk for diabetes in the US" – Diabetes Care 2007

Look at the table.

- (a) **Obese** males have a greater risk of developing Type 2 diabetes than males with a **healthy weight**.

Calculate how many times greater.

Show your working.

\_\_\_\_\_ times [2]

- (b) Obesity can also increase the risk of other types of disease.

Name one of these types of disease.

\_\_\_\_\_ [1]



(c) Give **two** lifestyle changes a person could make to help them lose weight.

1. \_\_\_\_\_

\_\_\_\_\_

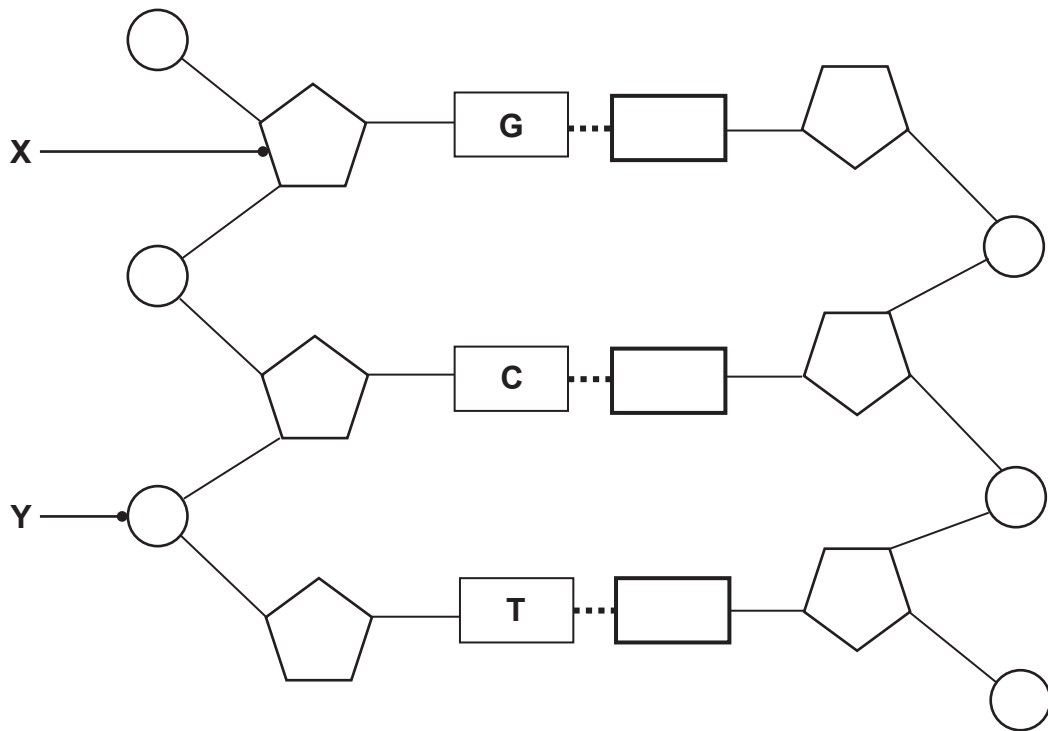
2. \_\_\_\_\_

\_\_\_\_\_ [2]

[Turn over



4 The diagram shows part of a DNA molecule.



Source: Chief Examiner

Look at the diagram.

(a) Name parts **X** and **Y**.

**X** \_\_\_\_\_

**Y** \_\_\_\_\_

[2]

(b) Complete the diagram by writing the letters of the three missing bases in the boxes.

[2]

(c) What term is used to describe the shape of a DNA molecule?

\_\_\_\_\_

[1]

(d) What term is used to describe the entire genetic material of an organism?

\_\_\_\_\_

[1]



5 The table gives information about three communicable diseases caused by microorganisms.

(a) Complete the table.

| Disease   | Type of microorganism | How the disease is spread | Prevention          |
|-----------|-----------------------|---------------------------|---------------------|
| flu       |                       | droplet infection         | vaccination         |
|           | fungus                | damp feet                 | dry feet thoroughly |
| chlamydia |                       |                           |                     |

[5]

(b) Describe how flu is spread by droplet infection.

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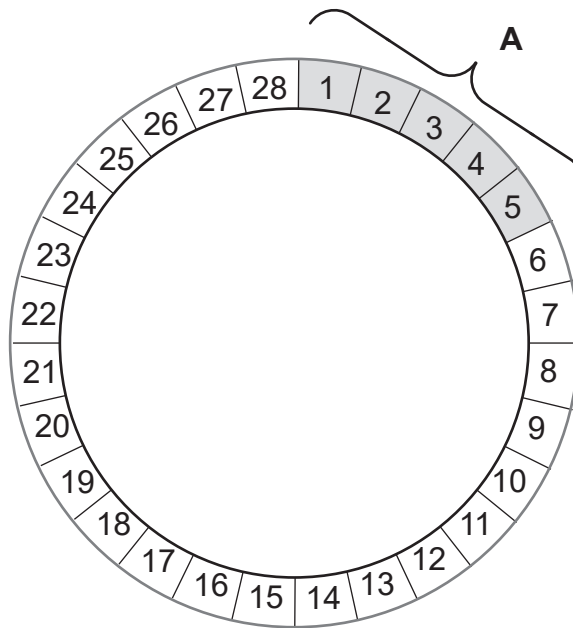
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[2]

[Turn over



6 (a) The diagram shows a 28-day menstrual cycle.



Source: Principal Examiner

Look at the diagram.

Stage A occurs during the first five days of the menstrual cycle.

(i) Give the term used to describe stage A.

\_\_\_\_\_

[1]

(ii) Describe what happens during stage A.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[2]





(b) (i) On which day is ovulation most likely to occur?

\_\_\_\_\_

[1]

(ii) Describe what happens during ovulation.

\_\_\_\_\_

\_\_\_\_\_ [1]

(c) Give **two** changes which would occur in the menstrual cycle if the woman became pregnant.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(d) Name a hormone which controls the menstrual cycle.

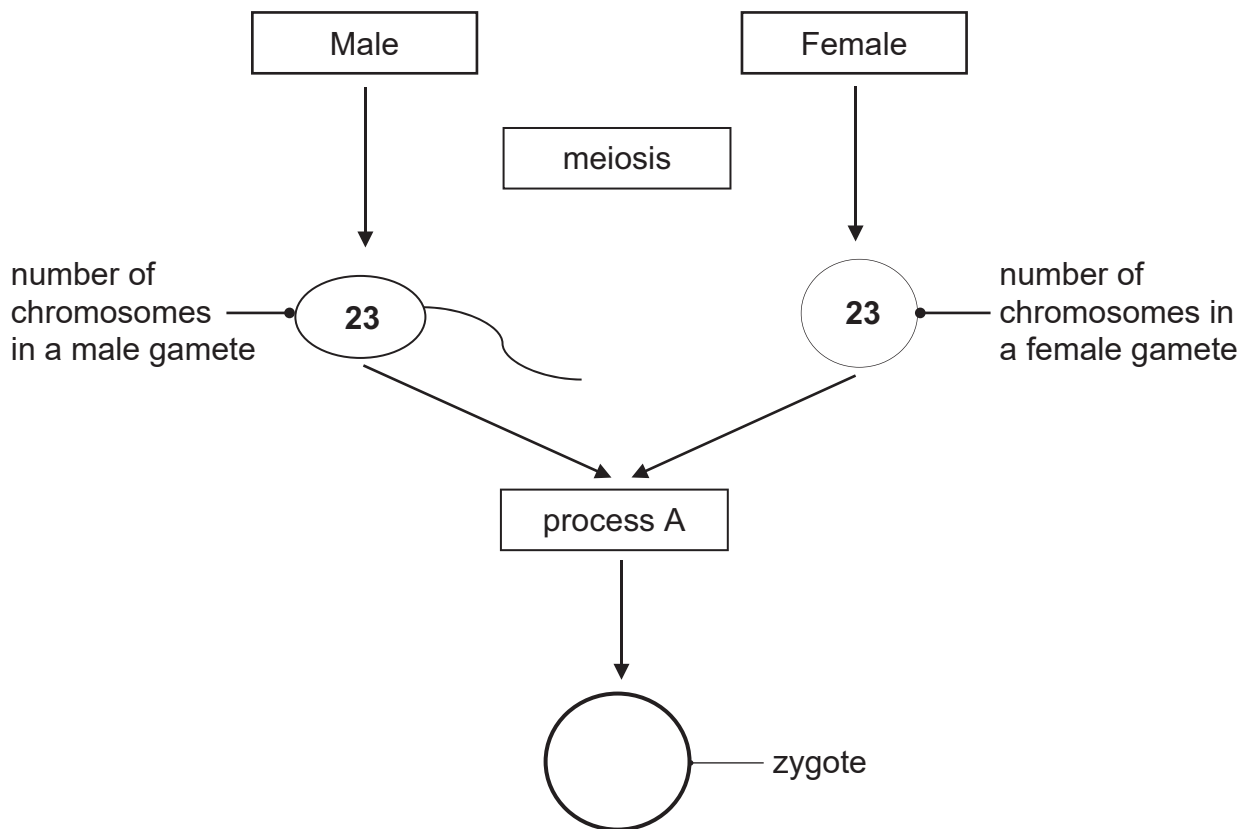
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[1]

[Turn over



7 (a) The diagram shows part of a human life cycle.



Look at the diagram.

(i) Name the organ where meiosis takes place

in the female body. \_\_\_\_\_

in the male body. \_\_\_\_\_

[2]

(ii) Name process A.

\_\_\_\_\_

[1]

(iii) Complete the diagram by writing the number of chromosomes in the zygote.

[1]



(b) (i) Complete the Punnett square to show how the sex of a child is determined.

|                |   | male gametes |  |
|----------------|---|--------------|--|
|                |   |              |  |
| female gametes | X |              |  |
|                | X |              |  |

[3]

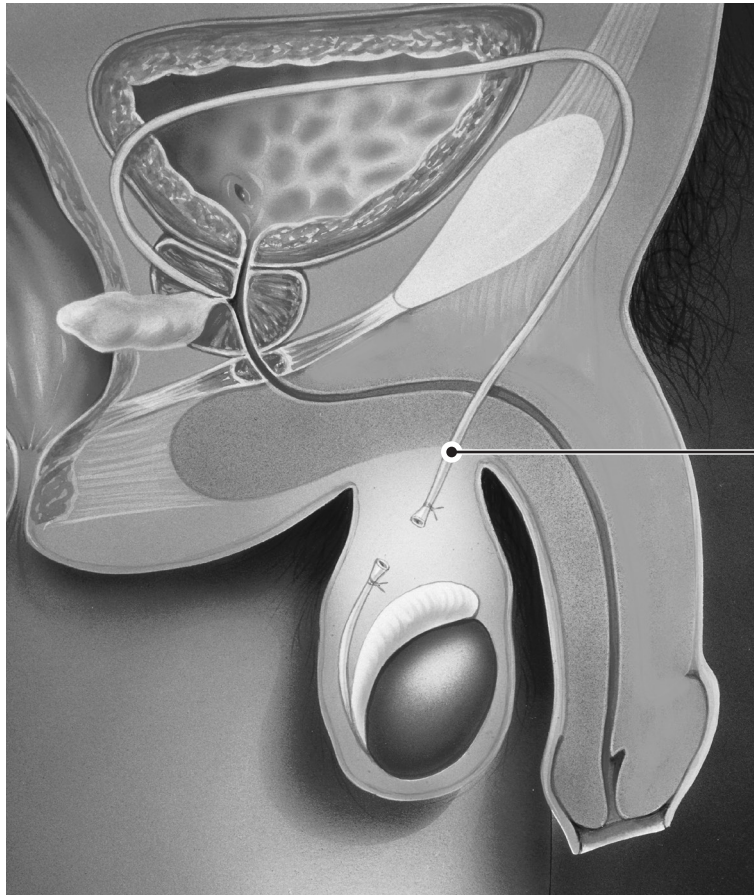
(ii) What is the percentage probability of a child being a female?

\_\_\_\_\_

[1]



- 8 (a) The diagram shows a surgical method of contraception in the male reproductive system.



Source: © David Gifford / Science Photo Library

Look at the diagram.

- (i) Part A has been cut and tied.

Name part A.

\_\_\_\_\_

[1]



(ii) Use evidence from the diagram to describe how this method of contraception prevents pregnancy.

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[3]

(iii) Give **one** advantage and **one** disadvantage of this method of contraception.

Advantage \_\_\_\_\_

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Disadvantage \_\_\_\_\_

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[2]

(b) Chemical methods of contraception can be used by females to prevent pregnancy.

(i) Name a chemical method of contraception used by females.

\_\_\_\_\_ [1]

(ii) Describe how this method of contraception prevents pregnancy.

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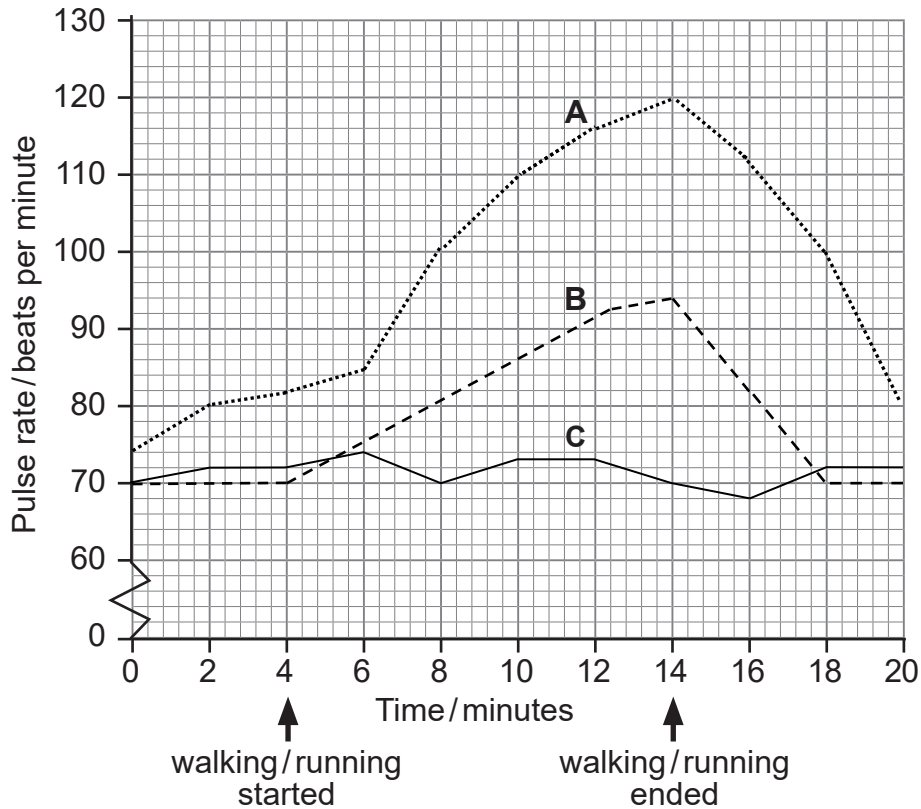
[1]

[Turn over



- 9 Three pupils, A, B and C had their pulse rates recorded every two minutes for 20 minutes. For part of the 20 minutes, two pupils exercised by walking or running. The third pupil did not exercise (at rest).

The graph below shows the pulse rates of the three pupils.



Source: Principal Examiner

Look at the graph.

- (a) Give the letter of the pupil who did not exercise.

Explain your answer.

**No data** is needed in your answer.

Pupil \_\_\_\_\_

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[2]



(b) Explain why it is necessary for the pulse rate to change during exercise.

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[3]

(c) Use the graph to calculate the time taken for the pulse rate of pupil **B** to return to rest, after exercise.

Show your working.

\_\_\_\_\_ minutes [2]

The pupil who carried out the **running** exercise prepared for the run by jogging on the spot, between 0 and 4 minutes.

(d) How does the graph support this statement?

Give **data** in your answer.

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[2]

[Turn over



10 Measles is a disease caused by a virus.

A worldwide measles vaccination programme was first introduced in 1963.

The table shows the percentage of people in the world vaccinated against measles between 1980 and 2015 and the number of reported cases of measles.

| Year | Percentage of people vaccinated / % | Number of reported cases / millions |
|------|-------------------------------------|-------------------------------------|
| 1980 | 48                                  | 3.1                                 |
| 1985 | 72                                  | 1.3                                 |
| 1990 | 75                                  | 0.9                                 |
| 2000 | 77                                  | 0.8                                 |
| 2005 | 80                                  | 0.8                                 |
| 2010 | 84                                  | 0.4                                 |
| 2015 | 85                                  | 0.3                                 |

Source: © WHO <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/>

Look at the table.

- (a) Give **two** pieces of evidence from the table which suggest the measles vaccination programme has been successful.

**No data** is needed in your answer.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]





A vaccine against measles contains a weakened form of the virus.

(b) Describe how this vaccine provides immunity against measles.

**In this question you will be assessed on the quality of your written communication skills, including the use of specialist scientific terms.**

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[6]

[Turn over



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Immunity to disease can be active or passive.

(c) Describe **two differences** between active and passive immunity.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]



11 (a) Explain how a plant loses water by transpiration.

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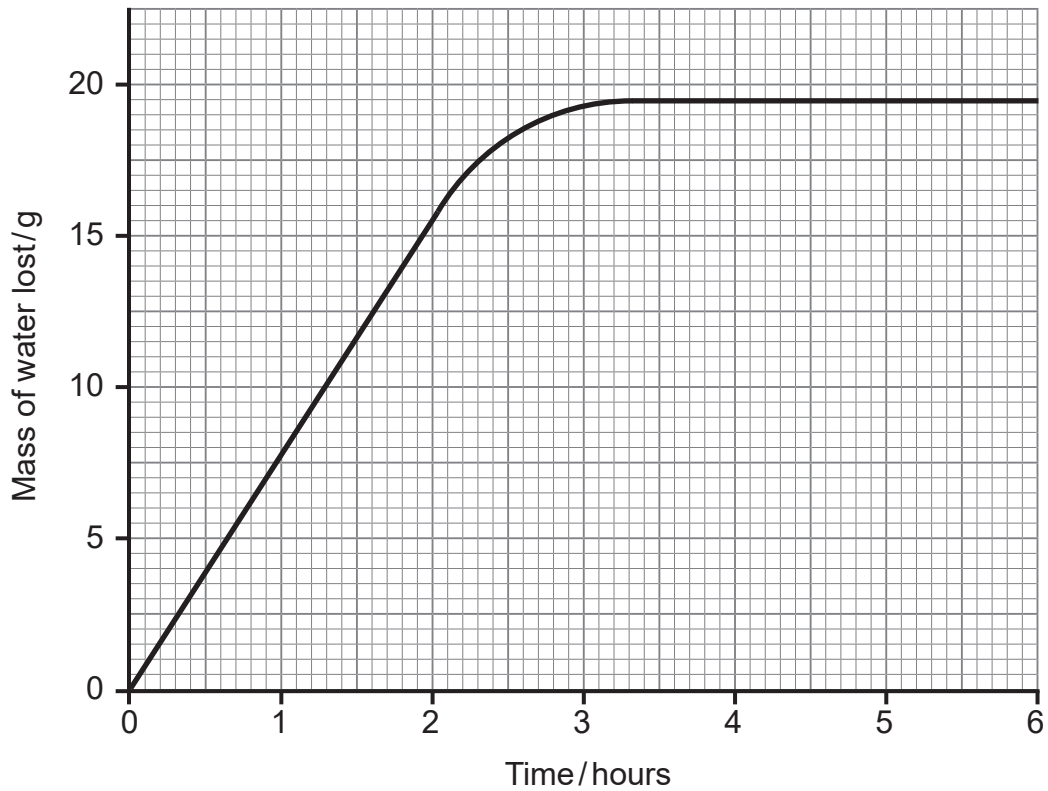
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[3]

(b) The graph shows the mass of water lost by a plant kept in windy conditions for six hours.



Source: Principal Examiner



(i) Calculate the rate of water loss per hour over six hours.

Give your answer to **one decimal place**.

Show your working.

\_\_\_\_\_ g per hour [3]

(ii) **Draw a curve on the graph** showing the water loss for the same plant in humid conditions. [1]

Transpiration is one way a plant uses water.

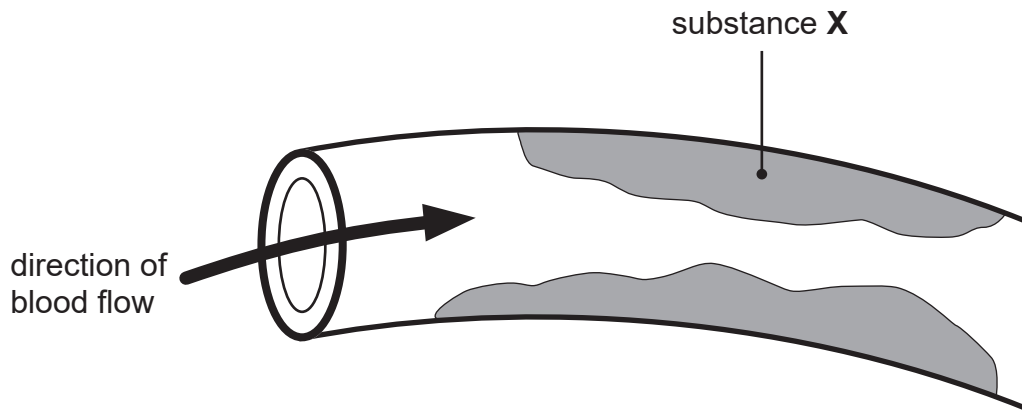
(c) Give **two other** ways a plant uses water.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]



12 (a) The diagram shows a section through an artery of a patient who has had a stroke.



Source: Principal Examiner

(i) Name substance X.

\_\_\_\_\_

[1]

(ii) Describe and explain why this patient may have another stroke if he does not receive treatment.

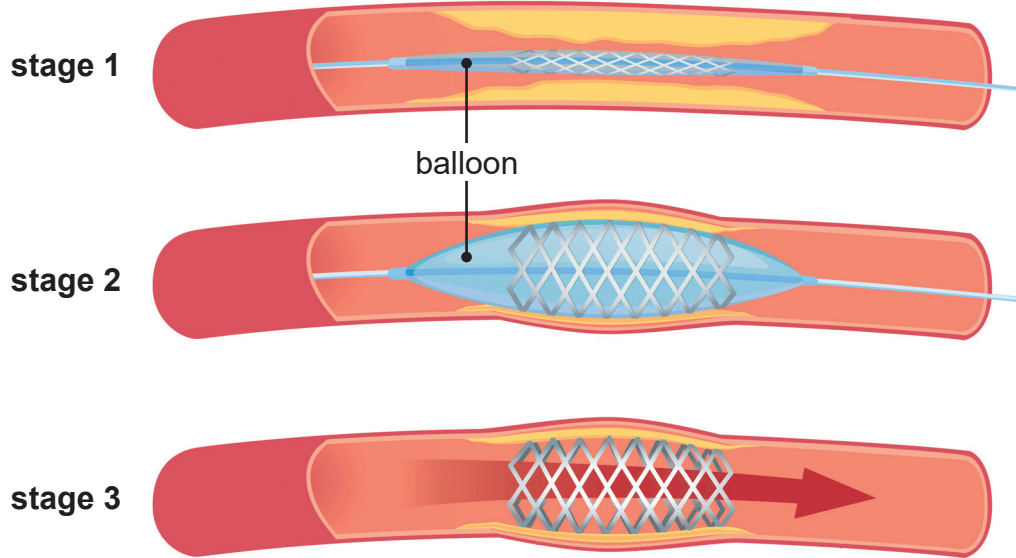
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4]



The diagrams show three stages in the treatment received by the patient to reduce the chances of having another stroke.

In stage 1, a wire cage containing a balloon is pushed into the artery.



Source: © Getty Images

(b) Use the diagrams to describe what happens in **stage 2** and **stage 3**.

Stage 2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Stage 3 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4]



Source: Images ©CCEA unless otherwise stated.

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**THIS IS THE END OF THE QUESTION PAPER**

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| For Examiner's use only |       |
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| Question Number         | Marks |
| 1                       |       |
| 2                       |       |
| 3                       |       |
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Examiner Number

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