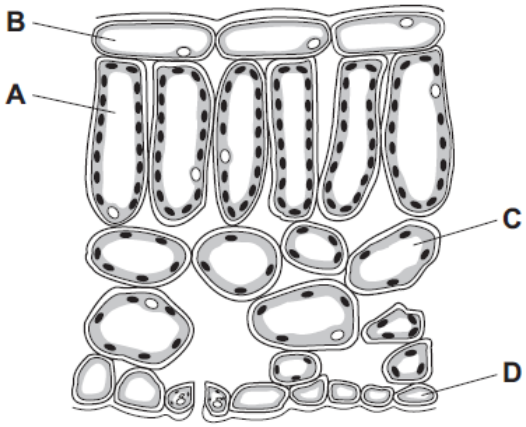
Plant nutrition – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.5

The diagram shows a cross-section of part of a leaf.

Which type of cell carries out the most photosynthesis?



2. Nov/2022/Paper_11/No.6

A plant cell is viewed using a microscope with a magnification of ×500. The image of the cell has a width of 20 mm.

What is the actual width of the cell?

A 0.04 mm **B** 0.2 mm **C** 4 mm **D** 25 mm

3. Nov/2022/Paper_11/No.7

Particles can move into and out of cells by diffusion.

Which statement about diffusion is correct?

A Particles move from a region of lower concentration to a region of higher concentration.

B Particles only move into cells by diffusion.

C The net movement of particles is against a concentration gradient.

D The process involves the random movement of particles.

4. Nov/2022/Paper_11/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

C glucose

D mineral ions

5. Nov/2022/Paper_11/No.13

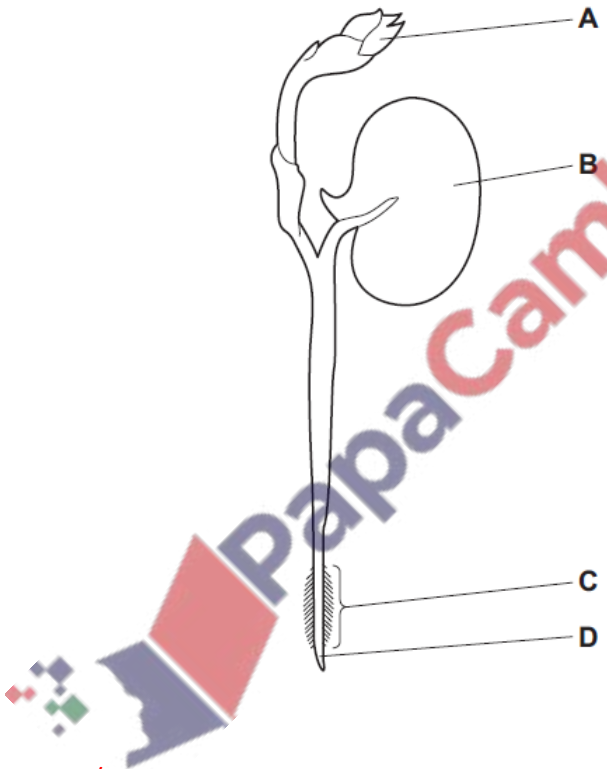
Which row shows what is needed for photosynthesis?

	carbon dioxide	chlorophyll	light	oxygen
A	yes	yes	yes	no
B	yes	no	yes	yes
C	no	no	no	yes
D	no	yes	no	no

6. Nov/2022/Paper_11/No.17

The diagram shows a bean seedling soon after it has germinated.

Where is most water absorbed?



7. Nov/2022/Paper_12/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

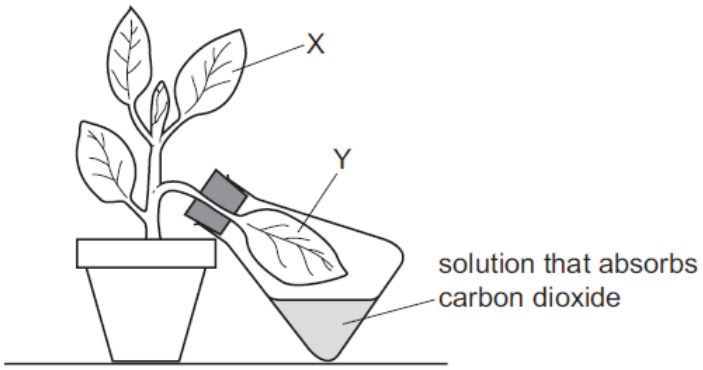
C glucose

D mineral ions

8. Nov/2022/Paper_12/No.13

The diagram shows an experiment to find out if carbon dioxide is necessary for photosynthesis.

The plant is kept in the dark for 48 hours to remove any starch. Then it is set up in the light, as shown.



After 10 hours, leaves X and Y were tested for starch.

What is the expected result?

	presence of starch	
	in leaf X	in leaf Y
A	✓	✓
B	✗	✗
C	✓	✗
D	✗	✓

key
✓ = present
✗ = absent

9. Nov/2022/Paper_13/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

C glucose

D mineral ions

10. Nov/2022/Paper_13/No.13

What is the word equation for photosynthesis?

A carbon dioxide + oxygen → glucose + water

B carbon dioxide + water → glucose + oxygen

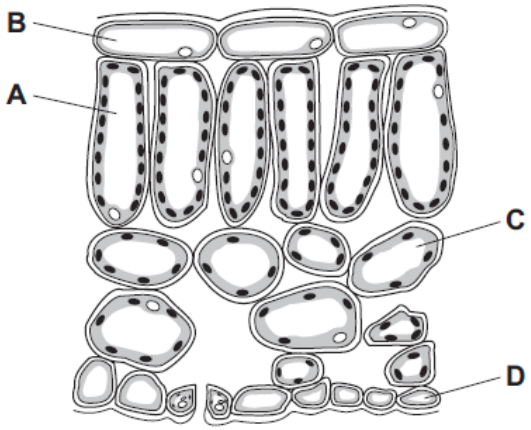
C oxygen + glucose → carbon dioxide + water

D oxygen + water → glucose + carbon dioxide

11. Nov/2022/Paper_21/No.4

The diagram shows a cross-section of part of a leaf.

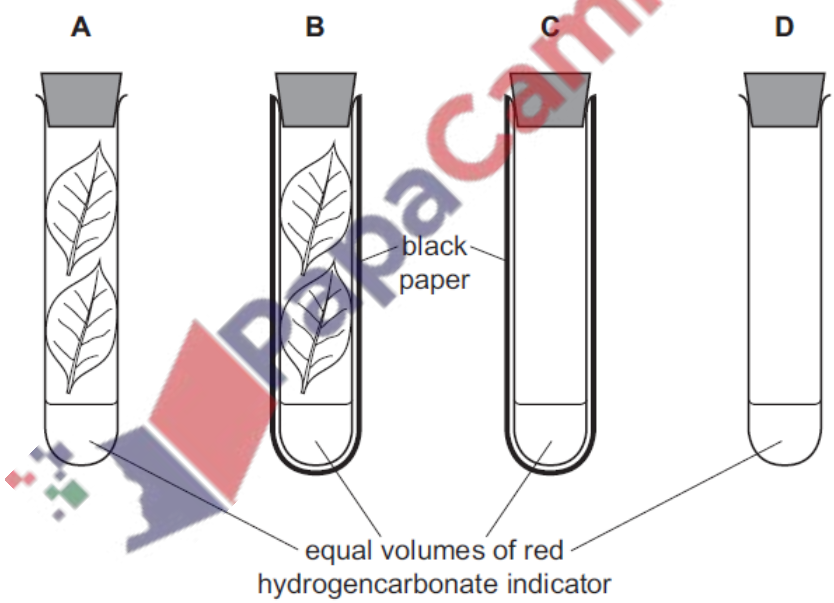
Which type of cell carries out the most photosynthesis?



12. Nov/2022/Paper_21/No.11

Four test-tubes are set up as shown. The test-tubes are kept at 20 °C in a water-bath, in the light, for two hours.

In which test-tube does the hydrogencarbonate indicator turn yellow?



13. Nov/2022/Paper_21/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

C glucose

D mineral ions

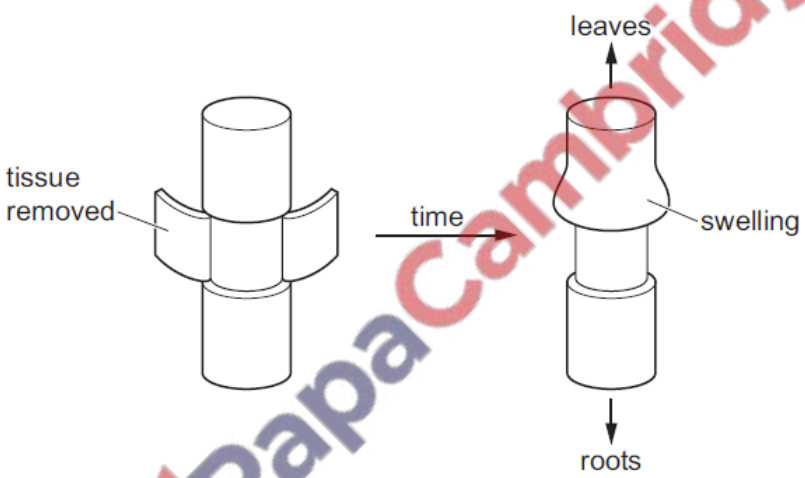
14. Nov/2022/Paper_21/No.16

Scientists investigate the movement of substances in a plant.

They cut a ring of tissue from the stem.

Removing the tissue removes some of the transport vessels found around the edge of the stem.

A few days later they notice swelling above the area where the tissue has been removed.



What causes the swelling?

A Phloem vessels have been removed and sucrose cannot move to the sink.

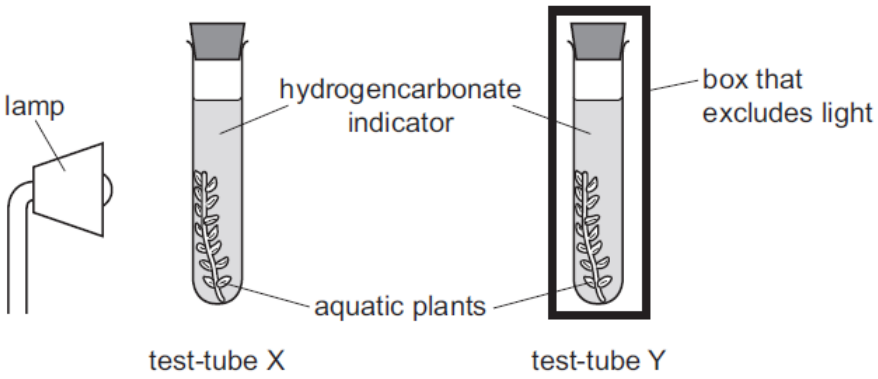
B Phloem vessels have been removed and sucrose cannot move to the source.

C Xylem vessels have been removed and minerals cannot move to the sink.

D Xylem vessels have been removed and minerals cannot move to the source.

15. Nov/2022/Paper_22/No.11

Two test-tubes were filled with hydrogencarbonate indicator. An aquatic plant was placed into each test-tube and the test-tubes were sealed with bungs, as shown.



Test-tube X was illuminated and test-tube Y was kept in the dark. The results are shown.

test-tube	colour of the hydrogencarbonate indicator	
	at the start of the investigation	at the end of the investigation
X	orange	red
Y	orange	yellow

What causes the colour changes in the hydrogencarbonate indicator in X and Y?

	X	Y
A	a decrease in the concentration of carbon dioxide	an increase in the concentration of carbon dioxide
B	a decrease in the concentration of oxygen	an increase in the concentration of oxygen
C	an increase in the concentration of carbon dioxide	a decrease in the concentration of carbon dioxide
D	an increase in the concentration of oxygen	a decrease in the concentration of oxygen

16. Nov/2022/Paper_22/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

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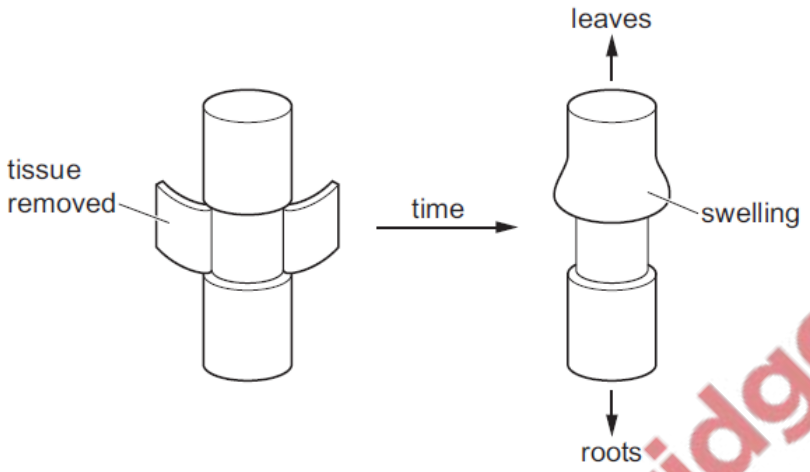
17. Nov/2022/Paper_22/No.16

Scientists investigate the movement of substances in a plant.

They cut a ring of tissue from the stem.

Removing the tissue removes some of the transport vessels found around the edge of the stem.

A few days later they notice swelling above the area where the tissue has been removed.



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B Phloem vessels have been removed and sucrose cannot move to the source.

C Xylem vessels have been removed and minerals cannot move to the sink.

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18. Nov/2022/Paper_23/No.16

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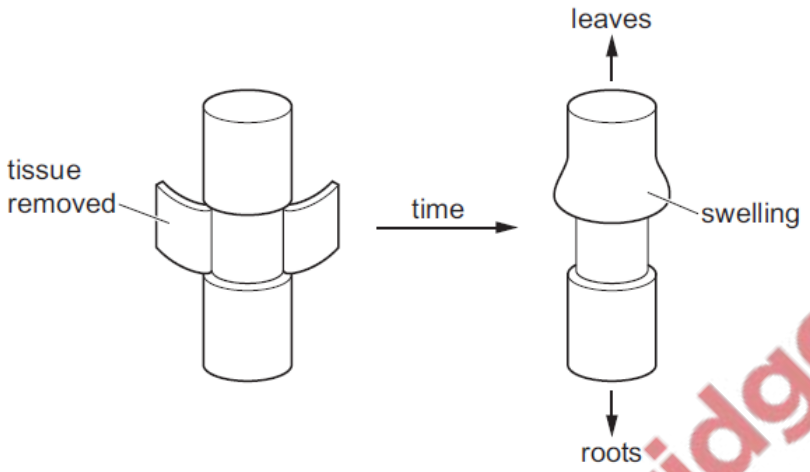

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19. Nov/2022/Paper_31/No.6

(a) Fig. 6.1 is a diagram of a section through a plant leaf.

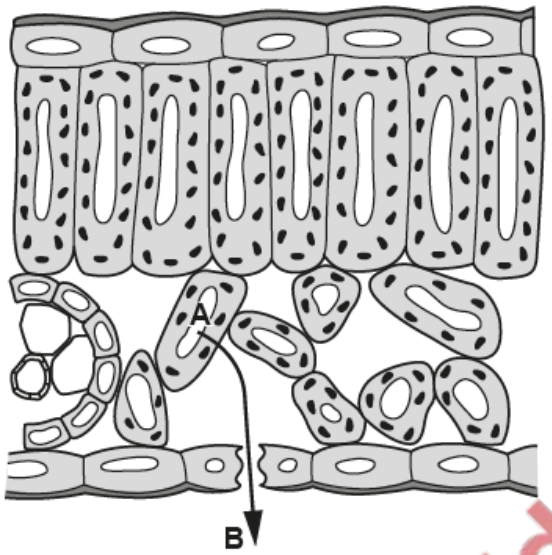

Fig. 6.1

(i) Draw a label line and a label to identify:

- a palisade mesophyll cell
- a vacuole.

[2]

(ii) Complete the sentence about the diffusion of gases.

Gases diffuse between the leaf and the surrounding air from a ..... concentration to a ..... concentration by ..... movement of particles.

[2]

(iii) State the name of the main gas that will diffuse from inside cell **A** to position **B** in Fig. 6.1 on a **sunny**, humid day.

..... [1]

(iv) State the name of the **cell** component through which substances diffuse as they enter or leave the cell.

..... [1]

(b) A group of students investigated the effect of light intensity on the rate of photosynthesis.

They used this method:

- An aquatic plant was placed in a test-tube containing water.
- A lamp was placed 10 cm from the aquatic plant.
- The number of bubbles of gas produced in one minute was counted and recorded in Table 6.1.
- The investigation was repeated with the lamp at different distances from the aquatic plant.

Fig. 6.2 is a diagram of the equipment used.

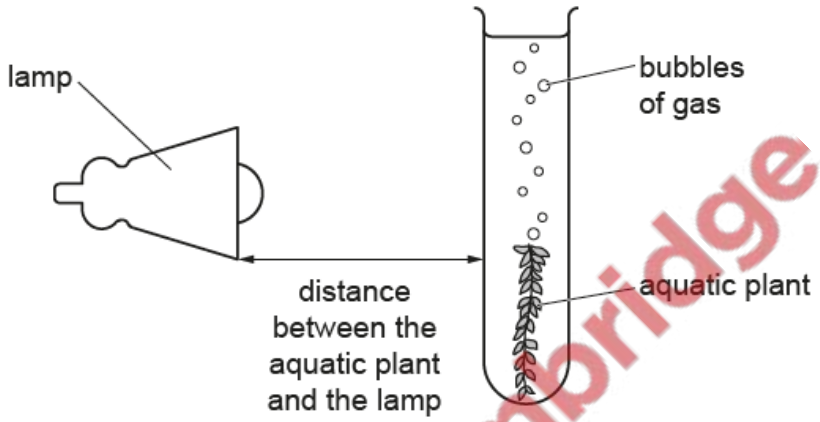

Fig. 6.2

The results are shown in Table 6.1.

Table 6.1

distance from the aquatic plant / cm	number of bubbles produced in one minute
10	90
15	85
20	75
40	50
50	30

(i) State the distance which gives the highest rate of photosynthesis.

..... cm [1]

(ii) Describe the effect of increasing light intensity on the rate of photosynthesis.

.....

.....

..... [1]

(iii) The student repeated the investigation but added a source of carbon dioxide to the water in the test-tube.

Suggest how this would affect the rate of photosynthesis.

.....

.....

..... [1]

(c) **(i)** State the name of **two** large carbohydrate molecules found in plants that can be made from glucose.

1 .....

2 .....
[2]

(ii) Plants can make glucose and proteins.

Using the words from the list, complete Table 6.2 to show **all** of the chemical elements that are found in glucose and all proteins.

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

carbon **hydrogen** **oxygen**

nitrogen **magnesium**

Table 6.2

glucose	all proteins

[2]

[Total: 13]

20. Nov/2022/Paper_41/No.3

(a) Fig. 3.1 shows some apparatus that was used to investigate water loss from a leafy shoot.

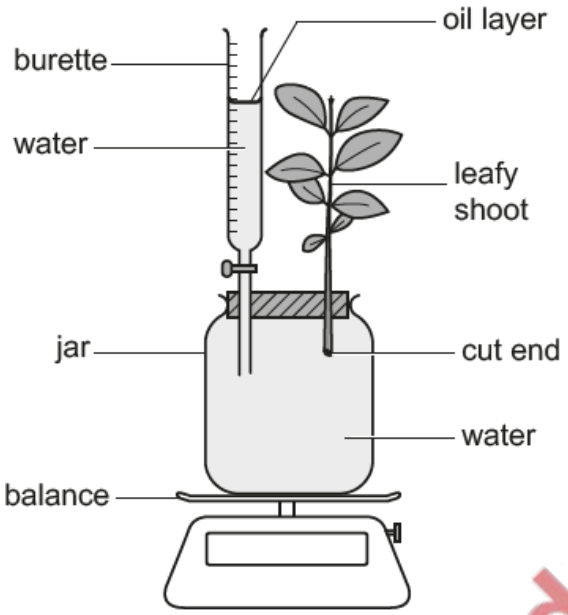

Fig. 3.1

(i) State the name of the process by which leafy shoots lose water.

..... [1]

(ii) Before the leafy shoot is inserted into the jar shown in Fig. 3.1, it must be recut under water.

Suggest why the end of the leafy shoot was cut under water.

.....

.....

..... [1]

(iii) State the purpose of the oil layer on top of the water in the burette.

.....

.....

..... [1]

(iv) Using the information in Fig. 3.1, describe **one** method that can be used to determine how much water is lost from the leafy shoot.

.....

.....

..... [1]

(b) The apparatus shown in Fig. 3.1 was used to investigate the effect of temperature on the rate of water loss in a species of plant. The results are shown in Fig. 3.2.

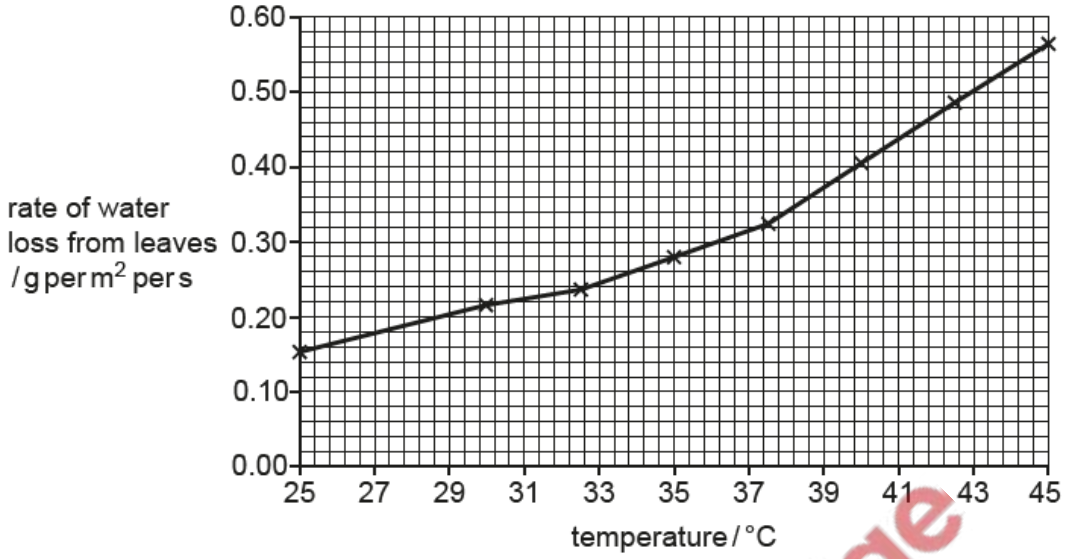

Fig. 3.2

(i) Using the information in Fig. 3.2, calculate how much water would be lost from 1 m^2 of leaves in 12 hours if the plants were kept at 35 °C. Include the unit.

.....

[3]

(ii) Using the information in Fig. 3.2, describe **and** explain the effect of increasing temperature on the rate of water loss in this species of plant.

.....

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.....

.....

.....

.....

[5]

(c) The apparatus shown in Fig. 3.1 can also be used to investigate the effects of changing humidity on water loss in plants.

(i) Suggest why the mass of water in the apparatus does **not** change when the leafy shoot is kept at 100% relative humidity.

.....

.....

.....

.....

..... [2]

(ii) Even at extremely low relative humidities the leafy shoot did not wilt.

Explain why the leafy shoot shown in Fig. 3.1 did **not** wilt.

.....

.....

..... [1]

(iii) The investigation on the effect of temperature was done at a relative humidity of 20%.

The investigation was repeated at a relative humidity of 80% and all other conditions were kept the same.

Predict how the water loss will differ from the trend shown in Fig. 3.2.

Sketch your prediction **on Fig. 3.2**.

[1]

[Total: 16]

21. Nov/2022/Paper_42/No.3(c)

(c) Sucrose travels from the stem to other parts of the plant known as sinks, where it is used.

(i) State **two** parts of a plant that are sinks for sucrose.

1 .....

2 .....

[2]

(ii) Sucrose is used in the cells of the sinks in a plant.

Describe the uses of sucrose by sinks.

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..... [3]