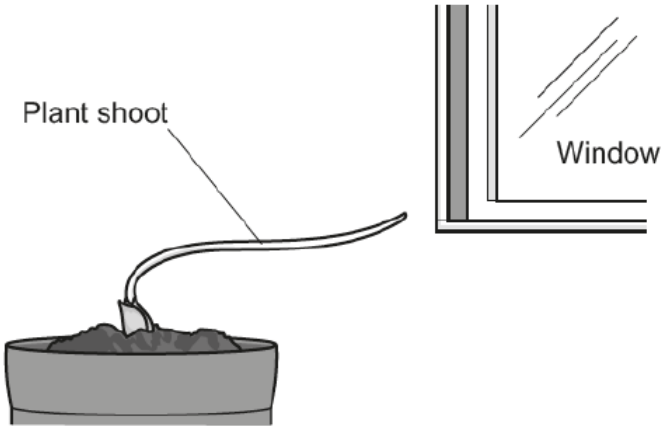
Using food and controlling growth – 2022 GCSE 21st GCSE Biology B

1. May/2022/Paper_J257/03/No.1

Plants respond to their environment.
One example is their response to light, as shown in the diagram.



(a) Complete each sentence to explain how the plant shoot responds to light.
Use words from the list.

auxins	**dark**	**insulin**	**less**
light	**more**	**progesterone**	**shade**

The response to light is controlled by plant hormones called ..... .

When the plant is placed in an environment where the light is coming from one direction, there is an uneven distribution of the hormone in the shoot.

..... hormone collects on the side of the shoot that is in the shade.

This causes more cell elongation on the side of the shoot that is in the

..... so the shoot grows towards the light.

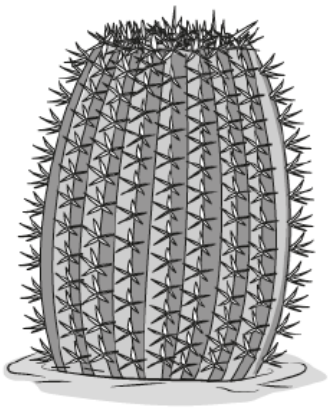
[3]

(b) What word is used to describe a plant root's response to gravity?

..... **[1]**

2. May/2022/Paper_J257/03/No.2

The diagram shows a cactus. It reproduces sexually by producing flowers.



(a) There are 22 chromosomes in all of the cells in this cactus apart from the gamete cells.

Complete the table to identify how many chromosomes are present during the events that take place in the life cycle of a cactus.

Tick (✓) **one** box in each row.

Event in the cactus life cycle	**Number of chromosomes**		
	11	**22**	**44**
At the end of interphase during meiosis			
At the end of interphase during mitosis			
In the cells produced by mitosis as the cactus grows			
In the pollen produced by meiosis			

[4]

A cactus must get water from the soil.

(b) Which process reacts water with carbon dioxide in plant cells?

Tick (✓) **one** box.

- Active transport ☐
- Cellular respiration ☐
- Photosynthesis ☐
- Transpiration ☐

[1]

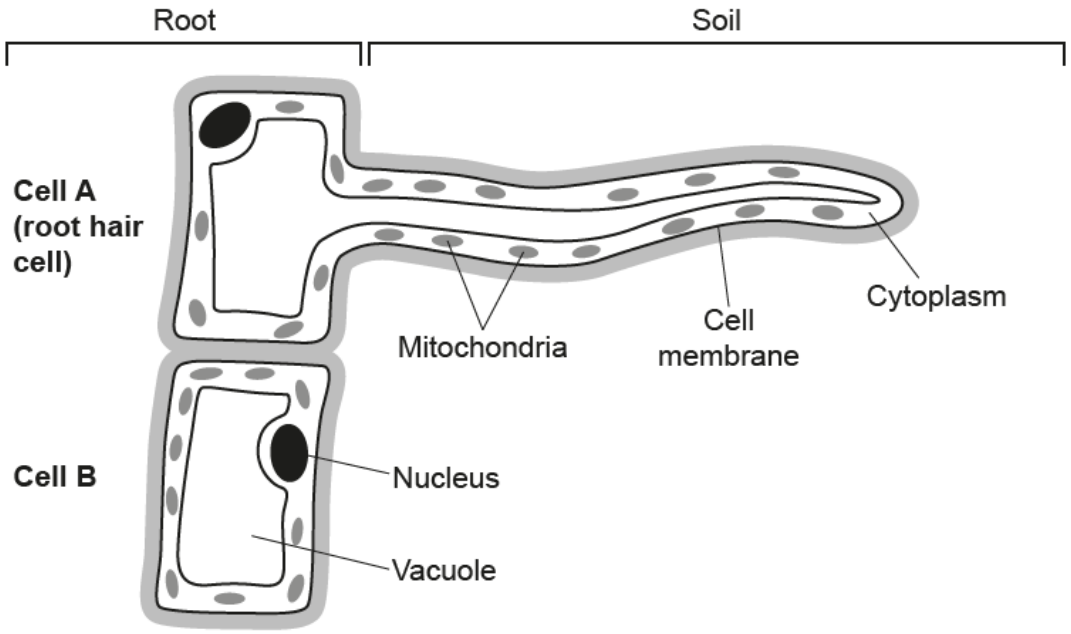
(c) Name the vessel in a plant that transports water up the stem.

..... **[1]**

3. May/2022/Paper_J257/04/No.6

Plants that grow in soil absorb water and nitrate ions through their roots.

Two cells from the outside edge of a root are shown in the diagram.



(a) Which statement explains why the cell membrane of the root hair cell is described as "partially permeable"?

Tick (✓) **one** box.

- Both water molecules and nitrate ions can diffuse through the membrane. ☐
- Neither water molecules nor nitrate ions can diffuse through the membrane. ☐
- Only the nitrate ions can diffuse through the membrane. ☐
- Only the water molecules can diffuse through the membrane. ☐

[1]

(b) Explain how water molecules are absorbed into the root hair cell from wet soil.

.....

.....

.....

.....

.....

..... **[3]**

(c) Explain how nitrate ions are absorbed into the root hair cell from the soil.

.....

.....

.....

.....

.....

..... **[3]**

(d) Explain why the structure of cell **A** means it is better than cell **B** at absorbing substances from the soil.

.....

.....

.....

..... **[2]**

4. May/2022/Paper_J257/01/No.3

This question is about cellular respiration.

(a) Which statement describes the process of cellular respiration?

Tick (✓) **one** box.

It is a photosynthetic reaction. ☐

It is an endothermic reaction. ☐

It is an exothermic reaction. ☐

It is an immune response. ☐

[1]

(b) Which type of cellular respiration produces ethanol?

Tick (✓) **one** box.

Aerobic respiration in animal cells ☐

Aerobic respiration in plant cells ☐

Anaerobic respiration in animal cells ☐

Anaerobic respiration in microorganisms ☐

[1]

(c) ATP is a product of cellular respiration.

Complete the table about ATP.

Tick (✓) **one** box in each column.

	Active transport	**Diffusion**	**Muscle contraction**
Does **not** use ATP			
Uses ATP			

[2]

ATP is produced in mitochondria.

A light microscope **cannot** be used to see the detailed structure of mitochondria.

(d) State **one** reason why an electron microscope **can** be used to see the detailed structure of mitochondria.

..... **[1]**

5. May/2022/Paper_J257/02/No.1

The circulatory system transports substances around the human body in the blood.

(a) State the name of the organ that pumps blood around the human body.

..... **[1]**

(b) Draw lines to connect each type of blood **vessel** with its correct **description**.

Vessel	Description
Artery	Has a thick, muscular wall to hold high pressure blood
Capillary	Has a thin elastic wall that enables the vessel to be squashed
Vein	Has a very thin wall only one cell thick

[2]

(c) State **two** nutrients that are absorbed into the blood in the digestive system.

1 .....

2 .....

[2]

(d) State **two** gases that are exchanged between the air and the blood in the gaseous exchange system.

1 .....

2 .....

[2]