

Name:

Date:

B1 - Test 3
CELL BIOLOGY
Intermediate

GCSE

BIOLOGY

AQA - Triple Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

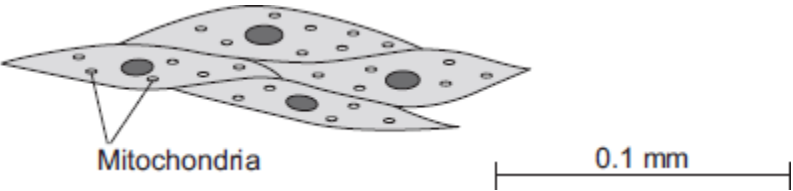
- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

- The marks for the questions are shown in brackets

1.

The image below shows some muscle cells from the wall of the stomach, as seen through a light microscope.



(a) Describe the function of muscle cells in the wall of the stomach.

(2)

(b) The figure above is highly magnified.

The scale bar in the figure above represents 0.1 mm.

Use a ruler to measure the length of the scale bar and then calculate the magnification of the figure above.

Magnification = _____ times

(2)

(c) The muscle cells in **Figure above** contain many mitochondria.

What is the function of mitochondria?

(2)

(d) The muscle cells also contain many ribosomes. The ribosomes cannot be seen in the figure above.

(i) What is the function of a ribosome?

(1)

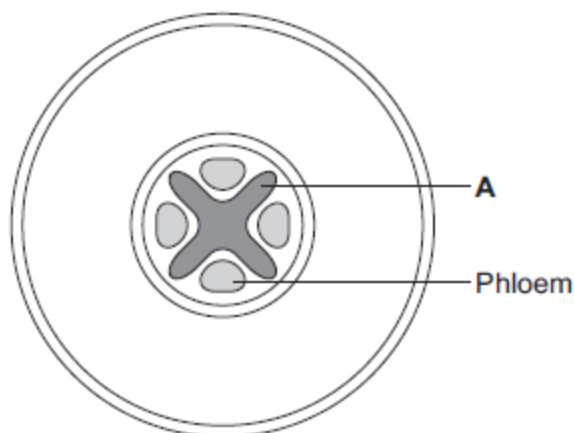
(ii) Suggest why the ribosomes **cannot** be seen through a light microscope.

(1)

(Total 8 marks)

2.

The diagram below shows a cross-section of a plant root. The transport tissues are labelled.



(a) (i) What is tissue **A**?

Draw a ring around the correct answer.

cuticle **epidermis** **xylem**

(1)

(ii) Name **two** substances transported by tissue **A**.

1. _____

2. _____

(2)

(b) Phloem is involved in a process called translocation.

(i) What is translocation?

(1)

(ii) Explain why translocation is important to plants.

(2)

(c) Plants must use active transport to move some substances from the soil into root hair cells.

(i) Active transport needs energy.

Which part of the cell releases most of this energy?

Tick (✓) **one** box.

mitochondria

nucleus

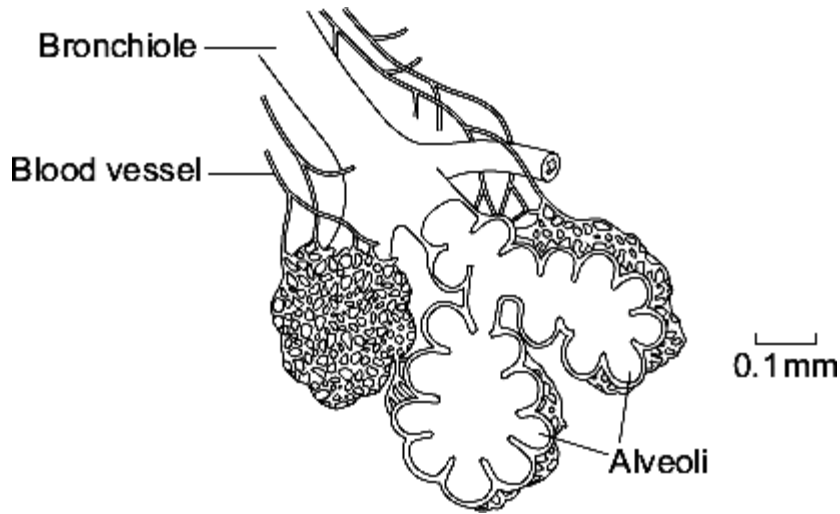
ribosome

(1)

(ii) Explain why active transport is necessary in root hair cells.

(2)
(Total 9 marks)

3. The human lung has about 80 million alveoli.
The diagram shows some alveoli in a human lung.



(a) Give **three** features of the alveoli that allow large amounts of oxygen to enter the blood.

1. _____

2. _____

3. _____

(3)

(b) (i) Name the process by which oxygen passes from the air into the blood.

(1)

Extra space _____

(Total 6 marks)

5.

Cells, tissues and organs are adapted to take in different substances and get rid of different substances.

The table shows the concentration of four ions outside cells and inside cells.

Ion	Concentration outside cells in mmol per dm ³	Concentration inside cells in mmol per dm ³
Sodium	140	9
Potassium	7	138
Calcium	2	27
Chloride	118	3

(a) Use information from the table above to complete the following sentences.

Sodium ions will move into cells by the process of _____.

Potassium ions will move into cells by the process of _____.

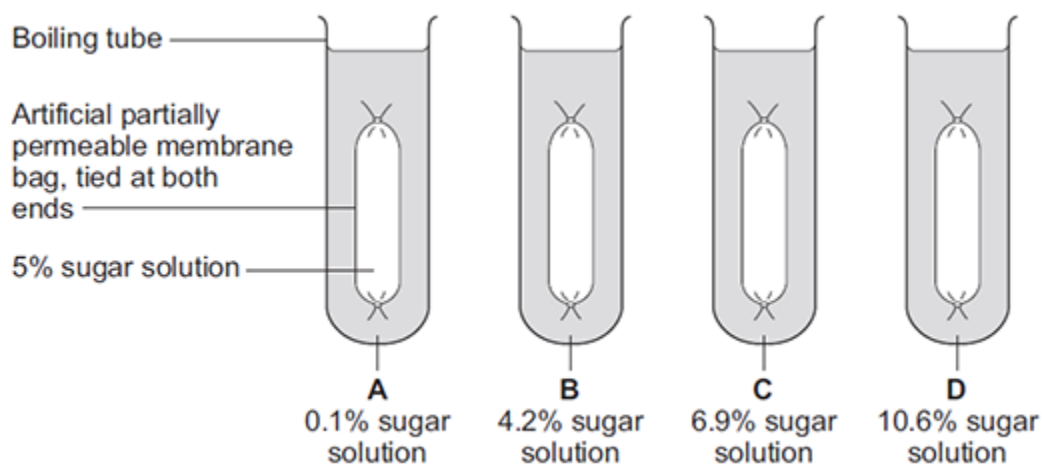
(2)

- (b) Some students investigated the effect of the different concentrations of sugar in four drinks, **A**, **B**, **C** and **D**, on the movement of water across a partially permeable membrane.

The students:

- made four bags from artificial partially permeable membrane
- put equal volumes of 5% sugar solution in each bag
- weighed each bag containing the sugar solution
- placed one bag in each of the drinks, **A**, **B**, **C** and **D**
- after 20 minutes removed the bags containing the sugar solution and weighed them again.

The diagram below shows how they set up the investigation.



- (i) The bag in drink **A** got heavier after 20 minutes.

Explain why.

(3)

- (ii) In which drink, **A**, **B**, **C** or **D**, would you expect the bag to show the smallest change in mass?

Tick (✓) **one** box.

A **B** **C** **D**

(1)

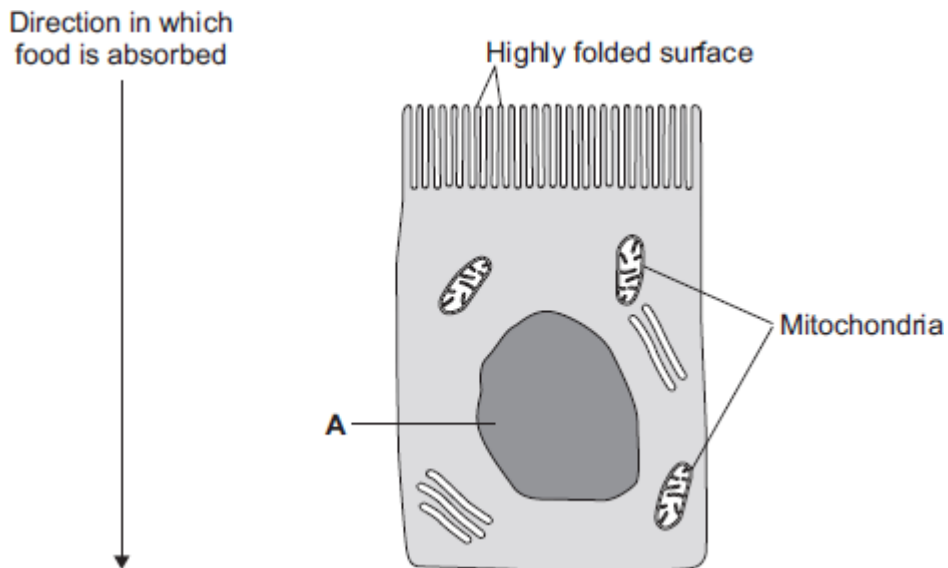
- (iii) Explain why you think the bag you chose in part **(b)(ii)** would show the smallest change.

(2)

(Total 8 marks)

6.

The image below shows an epithelial cell from the lining of the small intestine.



- (a) (i) In the image above, the part of the cell labelled **A** contains chromosomes.

What is the name of part **A**?

(1)

- (ii) How are most soluble food molecules absorbed into the epithelial cells of the small intestine?

Draw a ring around the correct answer.

diffusion

osmosis

respiration

(1)

- (b) Suggest how the highly folded cell surface helps the epithelial cell to absorb soluble food.

(1)

- (c) Epithelial cells also carry out active transport.

- (i) Name **one** food molecule absorbed into epithelial cells by active transport.

(1)

- (ii) Why is it necessary to absorb some food molecules by active transport?

(1)

- (ii) Suggest why epithelial cells have many mitochondria.

(2)

- (d) Some plants also carry out active transport.

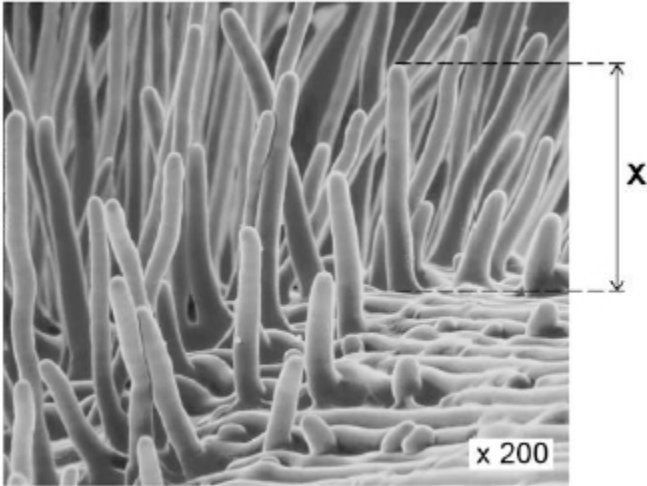
Give **one** substance that plants absorb by active transport.

(1)

(Total 8 marks)

7.

The image below shows part of a root from a cress plant.



(a) What type of microscope was used to create the image above?

(1)

(b) The magnification of the cress root in the image above is $\times 200$.
There are 1000 micrometres (μm) in a millimetre (mm).

Calculate the real length of the root hair, **X**.
Give your answer in micrometres (μm).

Real length **X** = _____ μm

(2)

(c) Root hair cells take up water from the soil.

Explain **one** way in which the root hair cell is adapted to this function.

(2)

The table shows the water uptake by a plant's roots on two different days.

	Mean water uptake in cm ³ per hour
Cold day	1.8
Hot day	3.4

(d) Explain why the mean rate of water uptake is higher on a hot day than on a cold day.

(3)

(e) The concentration of mineral ions in the soil is lower than in root hair cells.

Root hair cells take up mineral ions from the soil.

Root hair cells contain mitochondria.

Explain why root hair cells contain mitochondria.

(4)

(Total 12 marks)

8.

Plants transport water and mineral ions from the roots to the leaves.

(a) Plants move mineral ions:

- from a low concentration in the soil
- to a high concentration in the root cells.

What process do plants use to move these minerals ions into root cells?

Tick **one** box.

Active transport	<input type="checkbox"/>
Diffusion	<input type="checkbox"/>
Evaporation	<input type="checkbox"/>
Osmosis	<input type="checkbox"/>

(1)

(b) Describe how water moves from roots to the leaves.

(2)

(c) Plants lose water through the stomata in the leaves.

The epidermis can be peeled from a leaf.

The stomata can be seen using a light microscope.

The table below shows the data a student collected from five areas on one leaf.

Leaf area	Number of stomata	
	Upper surface	Lower surface
1	3	44
2	0	41
3	1	40
4	5	42
5	1	39
Mean	2	X

Describe how the student might have collected the data.

(3)

(d) What is the median number of stomata on the upper surface of the leaf?

(1)

(e) Calculate the value of **X** in the table.

Give your answer to 2 significant figures.

Mean number of stomata on lower surface of leaf = _____

(2)

(f) The plant used in this investigation has very few stomata on the upper surface of the leaf.

Explain why this is an **advantage** to the plant.

(2)

(Total 11 marks)