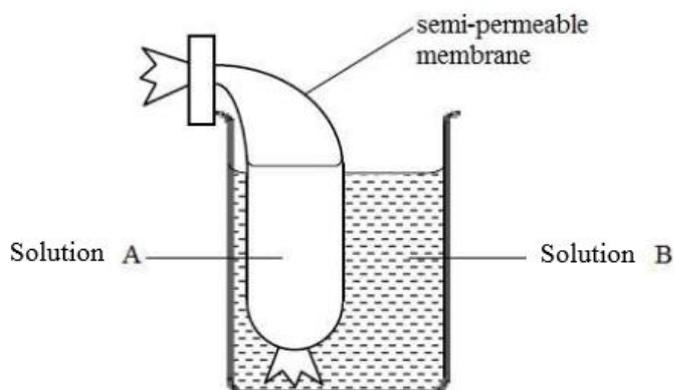


Characteristics of living things: past papers

1. During an experiment, students investigated the movement of particles across a semi permeable membrane. Two sugar solutions labelled A and B were used during the experiment.



Students measured the sugar concentration in each solution every 2 minutes and recorded their results in a table.

Time from the start of the experiment/minutes	Sugar concentration in arbitrary units	
	Solution A	Solution B
2	45	15
4	37	22
6	33	27
8	30	30

a) Define 'semi-permeable membrane'.

(1mark)

b) Name the more dilute sugar solution at the beginning of this experiment.

(1mark)

c) Draw arrows to show the direction of water molecules between Solutions A and B.

(1 mark)

d) Name and describe the process shown by the arrows drawn in c).

(1, 1marks)

e) Explain what happened after 8 minutes.

(1mark)

f) After 8 minutes, a student decided to add more sugar to Solution A. Predict the result obtained.

(1 mark)

(Annual 2015)

2 a. Diffusion is a passive type of transport. Explain.

(1 mark)

b. Students were provided with three blocks (A, B and C) of gelatine of different sizes containing an indicator which is red in an alkali solution but yellow in acidic conditions. The three blocks were simultaneously put in an acidic solution and the time for the red

colour to disappear was recorded. The results are shown in the table below:

<i>Block</i>	<i>Surface area: Volume ratio</i>	<i>Time for colour to disappear (minutes)</i>
A	3:5	12
B	4:5	6.5
C	1:1	4.75

(i) From the results shown in the table above, compare the time taken for the colour to disappear in relation to surface area to volume ratio.

(ii) Describe ONE other factor that affects the rate of diffusion, apart from the surface area to volume ratio.

(1,1 mark)

c. In living things, molecules and ions are sometimes pumped across the cell membranes. Name this type of transport.

(1 mark)

d. Describe TWO functions of the cell membrane.

(2 marks)

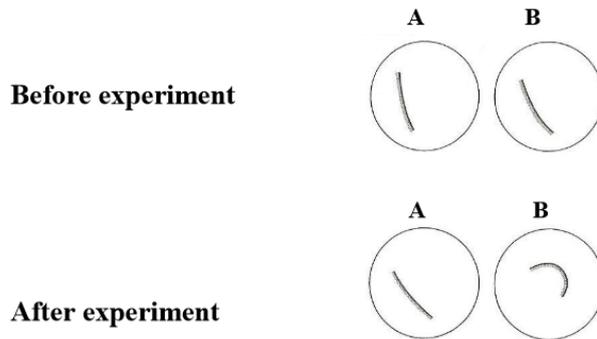
e. Name the outer layer surrounding the cell membrane in plant cells.

(1 mark)

Total: 7marks

Annual 2013

3. In an investigation to observe the process of osmosis, narrow strips of the dandelion stem were cut. One strip was put in a concentrated sugar solution while another strip was placed in an isotonic (same concentration) solution. The following diagram shows the two strips before and after the experiment.



Write the letter of the strip placed in concentrated sugar solution. Give a reason for your answer.

Letter:

(1 mark)

Reason:

(2 marks)

b. Explain why the strips used in this investigation were cut of equal size and thickness.

(2 marks)

c. List ONE other variable, besides stem size and thickness that must remain constant throughout the investigation.

(1 mark)

Total: 6 marks

Annual 2013

4. Name the cell structure described in each of the following statements:

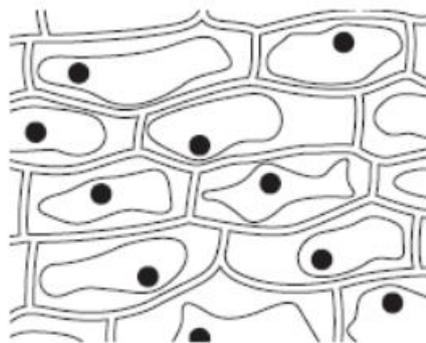
the part of the cell that contains chromosomes	
the part that absorbs light energy used for photosynthesis	
large permanent spaces filled with cell sap (a solution of sugar and salts)	
the organelle that produces energy for the cell	
the outermost layer of plant cells	

(1, 1, 1, 1, 1 mark)

Total 5 marks

Annual 2011

5. The following diagram shows plant cells that were left in a strong salt solution for six hours.



a. i) Describe what has happened to these cells.

ii) Name the process that brought about the effect shown in the diagram above.

(2, 1 mark)

b. Predict what happens to the plant cells if they were placed in distilled water instead in the strong salt solution.

(1 mark)

c. Mineral salts are absorbed by root hair cells by diffusion or active transport. State TWO differences between these two processes.

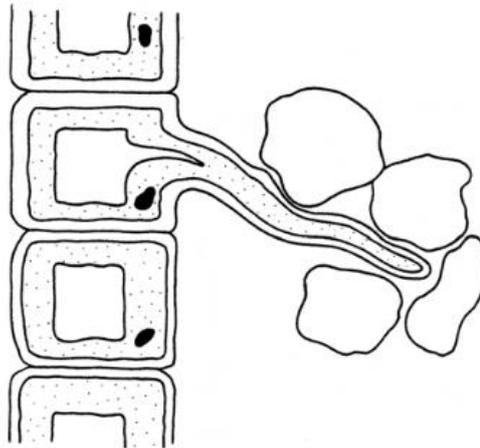
(2 marks)

Total 6 marks

Annual 2011

6. The following diagram shows part of a root in soil. a. Label the diagram with the words in the box.

cell wall, vacuole, cytoplasm, nucleus, soil particle, root hair



(3 marks)

b. Name the process by which water is absorbed by the roots from the soil.

(1 mark)

c. Mineral salts in the form of ions are drawn into the roots along with the water. They are taken up partly by passive diffusion. However they can be absorbed by the roots even when they are present in the soil in a lower concentration than inside the root cells. Name the process by which mineral salts can be taken up into the root cells when they are present in a low concentration in the soil.

(1 mark)

Total: 5 marks

Annual 2010