CAMBRIDGE IGCSE BIOLOGY · 0610

BIOLOGY



EXAM QUESTION PACK

TOPIC 3: MOVEMENT INTO AND OUT OF CELLS

SCORE	PERCENTAGE
/	%

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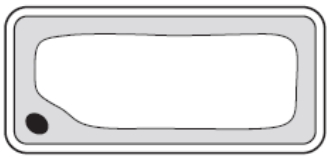
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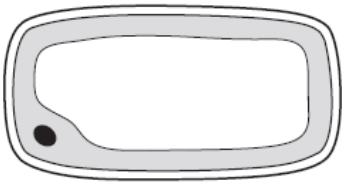
Movement into and out of cells – 2023 November IGCSE 0610

1. Nov/2023 /Paper_ 0610/11/No.6

The diagrams show how a cell appears under the microscope at the start of an experiment and after it has been placed in a dilute solution of salts for 5 minutes.



start of the experiment



after placing in a dilute solution of salts

Which statement explains what happens?

A Dissolved salts enter the cell by diffusion.

B Dissolved salts leave the cell by diffusion.

C Water enters the cell by osmosis.

D Water leaves the cell by osmosis.

2. Nov/2023 /Paper_ 0610/11/No.7

What causes the diffusion of oxygen into a plant cell?

A active transport

B movement of molecules

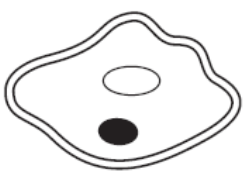
C osmosis

D photosynthesis

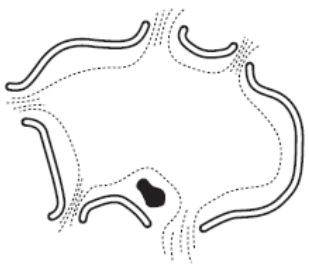
3. Nov/2023 /Paper_ 0610/13/No.6

Which diagram shows the appearance of a plant cell after it is placed in pure water?

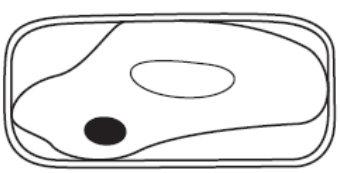
A



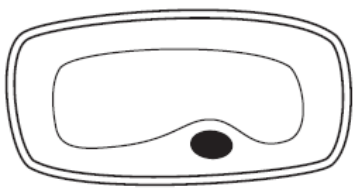
B



C



D



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4. Nov/2023 /Paper_ 0610/13/No.7

What would lead to a decrease in diffusion rate into a cell?

A greater concentration gradient

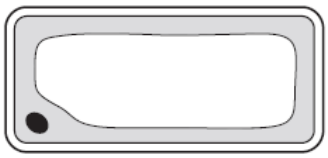
B higher temperature

C larger surface area of cell

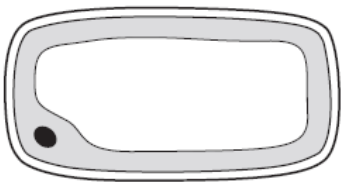
D thicker cell wall

5. Nov/2023 /Paper_ 0610/21/No.6

The diagrams show how a cell appears under the microscope at the start of an experiment and after it has been placed in a dilute solution of salts for 5 minutes.



start of the experiment



after placing in a dilute solution of salts

Which statement explains what happens?

A Dissolved salts enter the cell by diffusion.

B Dissolved salts leave the cell by diffusion.

C Water enters the cell by osmosis.

D Water leaves the cell by osmosis.

6. Nov/2023 /Paper_ 0610/21/No.7

The concentration of nitrate ions is higher inside a root hair cell than in the soil.

What would be required for the absorption of nitrate ions into the root hair cell?

1 mitochondria

2 oxygen

3 membrane proteins

4 cell wall

A 1, 2, 3 and 4

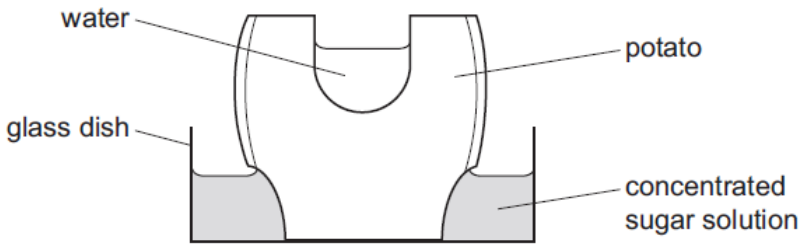
B 1, 2 and 3 only

C 1 and 2 only

D 1 only

7. Nov/2023 /Paper_ 0610/22/No.6

The diagram shows an experiment to investigate osmosis in living cells.



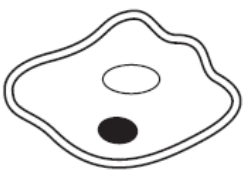
What happens to the volumes of water and sugar solution after 12 hours?

	volume of water	volume of sugar solution
A	decreases	increases
B	increases	increases
C	increases	remains the same
D	remains the same	decreases

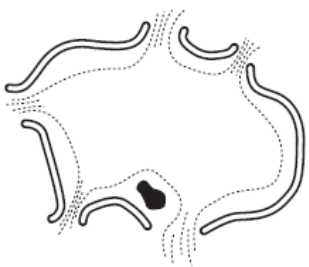
8. Nov/2023 /Paper_ 0610/23/No.6

Which diagram shows the appearance of a plant cell after it is placed in pure water?

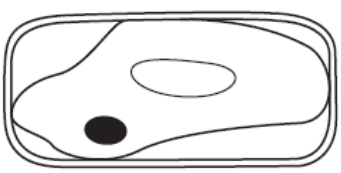
A



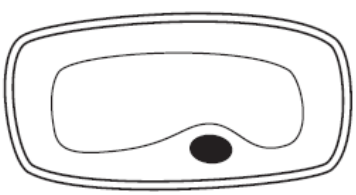
B



C



D



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9. Nov/2023 /Paper_ 0610/23/No.7

Which process requires active transport?

A oxygen movement from the alveoli to the blood

B ion uptake by root hair cells from the soil

C water movement through a plant by transpiration pull

D absorption of water into a lacteal in a small intestine villus

10. Nov/2023 /Paper_ 0610/31/No.1

(a) Complete the sentences about movement into and out of cells.

Diffusion is the net movement of particles down a concentration gradient.

The energy for diffusion comes from the ..... energy of random movement of molecules and ions.

Factors that influence diffusion include concentration gradient, ... , and ..... .

Osmosis is the movement of water by diffusion through a ..... permeable membrane.

The movement of particles through a cell membrane against a concentration gradient using energy from ..... is called ..... .

[6]

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(b) Fig. 1.1 is a diagram of a normal red blood cell.

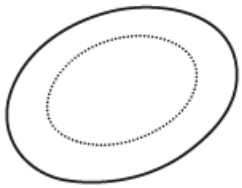


Fig. 1.1

Fig. 1.2 shows three red blood cells that have been placed in different concentrations of a salt solution.

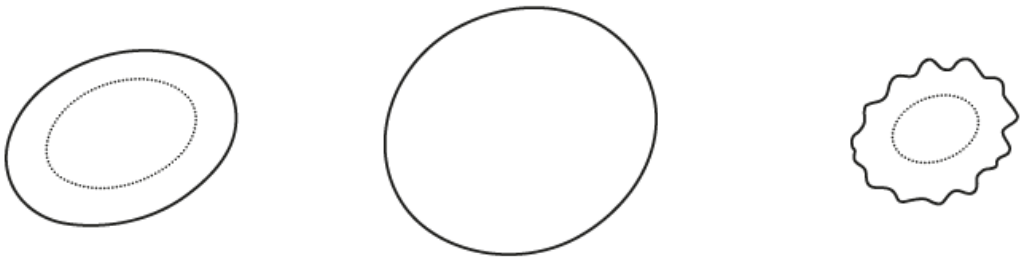


Fig. 1.2

Identify the cell that has been placed in a very concentrated salt solution.

Give reasons for your answer.

cell .....

reasons .....

.....

.....

.....

.....

.....

[3]

(c) Water is needed by all organisms.

State **two** processes in organisms that use water as a solvent.

1 .....

2 .....

[2]

[Total: 11]

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11. Nov/2023 /Paper_ 0610/33/No.2

Water moves into and out of cells by osmosis.

(a) State **two** plant cell structures that water moves through to reach the cytoplasm.

1 .....

2 .....

[2]

(b) Potato plant tissue was used to investigate osmosis.

Potato cylinders were placed into different sucrose solutions for 30 minutes.

The masses of the potato cylinders were measured before and after being placed into the solutions.

The difference in mass was calculated for each potato cylinder.

Table 2.1 shows the results of the investigation.

Table 2.1

concentration of sucrose solution / mol per dm^3	starting mass of potato cylinder / g	final mass of potato cylinder / g	difference in mass / g	percentage change in mass
0.0	2.31	2.53	0.22	9.52
0.2	2.35	2.49	0.14	5.96
0.4	2.28	2.34	0.06	2.63
0.6	2.30	2.21	–0.09	
0.8	2.34	2.19	–0.15	–6.41

(i) Using the information in Table 2.1, calculate the **percentage change in mass** for the potato cylinder in the 0.6 mol per dm^3 sucrose solution.

Give your answer to **two** decimal places.

Space for working.

..... %

[3]

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(ii) Describe the expected appearance of the potato cylinder that was placed in the 0.8 mol per dm^3 sucrose solution for 30 minutes.

.....

.....

..... [1]

(iii) Using the results in Table 2.1, describe how the concentration of sucrose solution affects the percentage change in mass of the potato cylinders.

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..... [2]

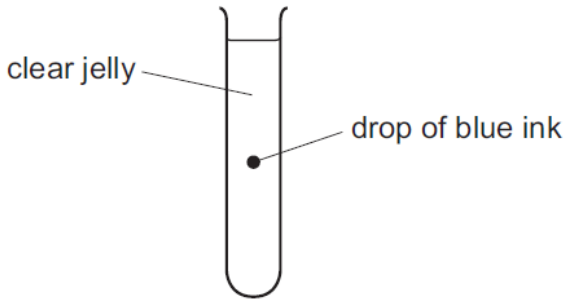
[Total: 8]

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Movement into and out of cells – 2023 June IGCSE 0610

1. June/2023/Paper_0610/11/No.6

The diagram shows a test-tube containing clear jelly. A drop of blue ink is injected into the middle of the jelly.



The blue colour of the ink spreads throughout the jelly.

By which process does the blue ink spread through the jelly?

A active transport

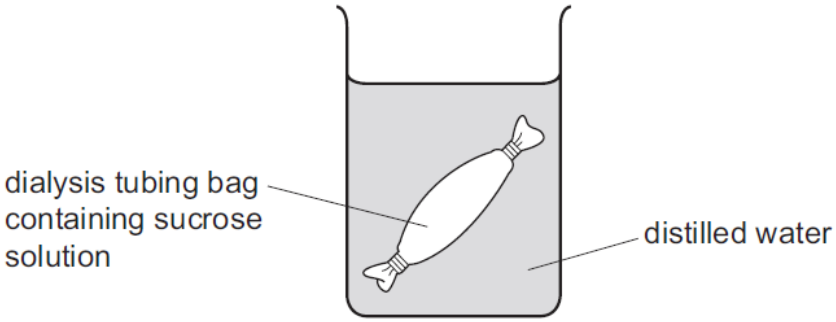
B catalysis

C diffusion

D osmosis

2. June/2023/Paper_0610/11/No.7

The diagram shows some of the apparatus used in an osmosis investigation.



In this investigation a dialysis tubing bag was filled with sucrose solution, sealed and weighed.

The dialysis tubing bag was then immersed in distilled water for one hour.

After one hour the dialysis tubing bag was removed from the beaker, the surface was dried and the bag was reweighed.

Which row explains what will happen during the investigation?

	mass of the dialysis tubing bag at the end of the investigation	net movement of sucrose molecules	net movement of water molecules
A	decreased	none	out of the bag
B	decreased	into the bag	out of the bag
C	increased	none	into the bag
D	increased	out of the bag	into the bag

3. June/2023/Paper_0610/11/No.8

Which row describes active transport of ions?

	direction of movement of ions	requires energy from respiration
A	from high concentration to low concentration	yes
B	from low concentration to high concentration	no
C	from high concentration to low concentration	no
D	from low concentration to high concentration	yes

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4. June/2023/Paper_0610/12/No.6

Which statements are correct for **both** diffusion and osmosis?

	involves movement of water only	requires energy from respiration	molecules move from higher concentration to lower concentration
A	✓	✓	✓
B	✓	✓	✗
C	✗	✗	✓
D	✗	✗	✗

key

✓ = yes

✗ = no

5. June/2023/Paper_0610/12/No.8

The concentration of sodium ions in the soil is lower than the concentration inside root hair cells.

Which process will be used when sodium ions are taken into root hair cells from the soil?

A active transport

B diffusion

C osmosis

D transpiration

6. June/2023/Paper_0610/13/No.7

A tuber from a potato plant was cut into pieces of identical length. The pieces of potato were placed in four different solutions for three hours.

1 pure water

2 a sugar solution that is less concentrated than the potato cell contents

3 a sugar solution that is more concentrated than the potato cell contents

4 a sugar solution that is the same concentration as the potato cell contents

Which solutions will cause the pieces of potato to change in length?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1 and 4 only

D 2 and 3 only

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7. June/2023/Paper_0610/13/No.8

Which row shows the features of active transport?

	requires energy from respiration	movement against a concentration gradient	movement of water molecules only
A	✓	✗	✓
B	✗	✗	✓
C	✓	✓	✗
D	✗	✓	✓

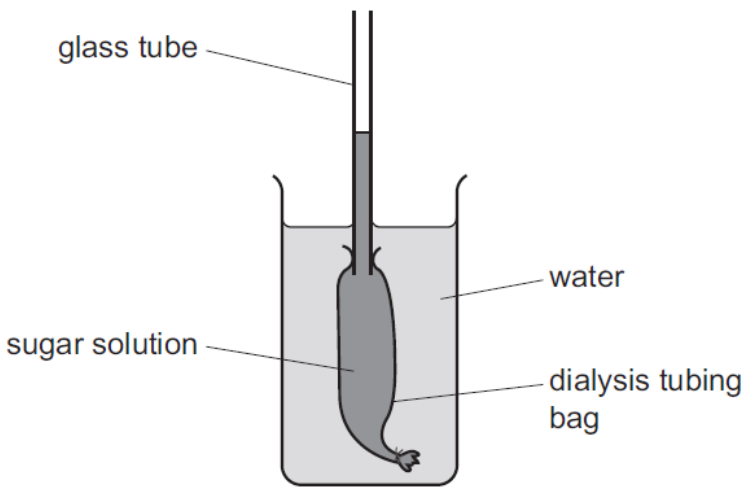
key

✓ = yes

✗ = no

8. June/2023/Paper_0610/21/No.5

The diagram shows an experiment demonstrating osmosis using a dialysis tubing bag.



After 30 minutes, the level of the liquid in the glass tube goes .....1..... because the water had a .....2..... water potential than the sugar solution.

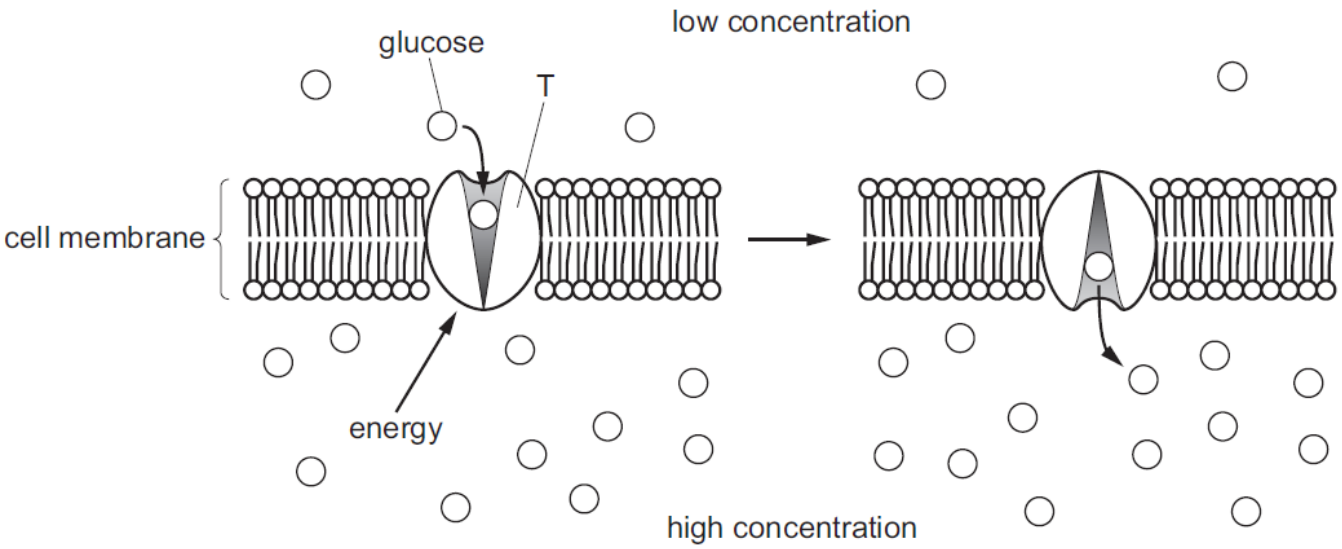
Which words correctly complete the statement?

	1	2
A	down	lower
B	down	higher
C	up	lower
D	up	higher

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9. June/2023/Paper_0610/21/No.6

The diagram shows the movement of glucose molecules across a cell membrane.



Which statement describes molecule T?

A It is a fat molecule used to transport glucose down a concentration gradient.

B It is a fat molecule used to transport glucose against a concentration gradient.

C It is a protein molecule used to transport glucose down a concentration gradient.

D It is a protein molecule used to transport glucose against a concentration gradient.

10. June/2023/Paper_0610/23/No.5

When a plant cell is put into pure water it .....1..... water by osmosis and becomes .....2..... .

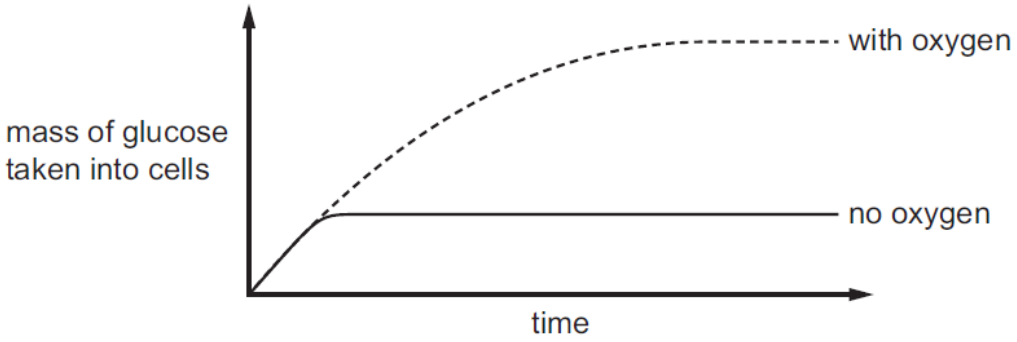
Which words should be used to fill gaps 1 and 2 to complete the sentence?

	1	2
A	gains	plasmolysed
B	gains	turgid
C	loses	plasmolysed
D	loses	turgid

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11. June/2023/Paper_0610/23/No.6

The graph shows the results of an investigation into the effect of oxygen on the uptake of glucose by cells.



Which conclusion can be made about these data?

A Glucose only enters the cells by active transport.

B Glucose only enters the cells by diffusion.

C Glucose enters the cells by both active transport and diffusion.

D Glucose enters the cells by osmosis.

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12. June/2023/Paper_0610/41/No.2a

A student investigated osmosis in potato plant cells.

He immersed cubes of potato tissue in water and different concentrations of sucrose solution for 30 minutes.

The masses of the potato cubes were measured before and after immersion.

The percentage changes in mass were calculated.

Table 2.1 shows the results.

Table 2.1

concentration of sucrose solution / mol dm^{-3}	mass of potato cube before immersion / g	mass of potato cube after immersion / g	percentage change in mass
0.00	1.32	1.50	13.64
0.20	1.34	1.49	11.19
0.40	1.30	1.34	3.08
0.60	1.33	1.29	–3.01
0.80	1.22	1.12	–8.20
1.00	1.28	1.11	

(i) Using the information in Table 2.1, calculate the percentage change in mass at 1.00 mol dm^{-3}.

Give your answer to **two** decimal places.

Space for working.

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(ii) Using the information in Table 2.1, explain the difference in the results between the $0.6\,mol\,dm^{-3}$ and the $0.8\,mol\,dm^{-3}$ sucrose solutions.

Use the term water potential in your answer.

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..... [5]

(iii) Describe the expected appearance of a cell from a potato cube that has been immersed in distilled water for 30 minutes.

.....

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.....

..... [2]

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13. June/2023/Paper_0610/41/No.2b

Describe how the process of active transport differs from the process of osmosis.

.....

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.....

.....

.....

.....

..... [3]

14. June/2023/Paper_0610/41/No.2c

State the type of plant cells that use active transport to absorb mineral ions from the environment.

..... [1]

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15. June/2023/Paper_0610/43/No.1

(a) The movement of molecules within an organism can occur by diffusion and active transport.

Complete Table 1.1 by placing ticks (✓) to show the correct features of each process.

Table 1.1

feature	active transport	diffusion
movement of particles always occurs across a cell membrane		
movement of molecules during gas exchange		
rate of movement of particles is higher when the concentration gradient is larger		
requires energy from respiration		

[4]

(b) Explain why active transport is important in root hair cells.

.....

.....

.....

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.....

.....

..... [3]

[Total: 7]

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16. March/2023/Paper_ 0610/12/No.6

Which factor would **decrease** the rate of diffusion of oxygen into cells?

A increasing concentration gradient

B increasing surface area

C increasing temperature

D increasing thickness of cell membrane

17. March/2023/Paper_ 0610/12/No.7

Which molecule crosses a partially permeable membrane during osmosis?

A carbon dioxide

B oxygen

C urea

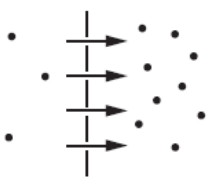
D water

18. March/2023/Paper_ 0610/12/No.8

The diagrams show the movement of particles across a membrane. The arrows show the direction of movement.

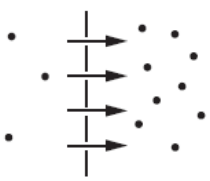
Which diagram shows active transport?

A



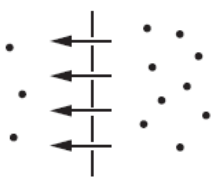
using energy from respiration

B



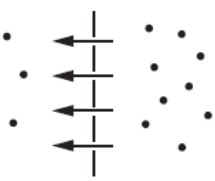
not using energy from respiration

C



using energy from respiration

D



not using energy from respiration

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Movement into and out of cells – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.8

Potato cylinders were put into different concentrations of sucrose solution for the same amount of time. The masses of the potato cylinders were measured before and after being immersed in the solutions.

The results are recorded in the table.

Which potato cylinder was put into the solution with the highest sucrose concentration?

	mass before immersion /g	mass after immersion /g	percentage change in mass
A	1.95	1.92	–1.5
B	2.05	1.95	–4.9
C	2.10	2.13	+1.4
D	2.25	2.20	–2.2

2. Nov/2022/Paper_12/No.8

Which row shows features of osmosis in cells?

	requires a cell membrane	requires a cell wall	water can move into the cell	water can move out of the cell
A	✓	✓	✓	✓
B	✓	✗	✓	✓
C	✓	✓	✗	✓
D	✗	✓	✓	✗

key
✓ = yes
✗ = no

3. Nov/2022/Paper_12/No.23

Which process could continue without energy from respiration?

A active transport

B growth

C osmosis

D protein synthesis

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4. Nov/2022/Paper_13/No.8

Which row describes active transport?

	direction of movement	particles move through a cell membrane	energy required
A	from a region of higher concentration to a region of lower concentration	yes	no
B	from a region of higher concentration to a region of lower concentration	no	no
C	from a region of lower concentration to a region of higher concentration	no	yes
D	from a region of lower concentration to a region of higher concentration	yes	yes

5. Nov/2022/Paper_13/No.7

Which statement is about osmosis?

A movement of water through a partially permeable membrane

B movement of sodium ions from a high concentration to a low concentration

C movement of sodium ions from a low concentration to a high concentration

D requires energy from respiration

6. Nov/2022/Paper_21/No.5

Some examples of substances moving across membranes are listed.

1 glucose molecules into the epithelium that lines the small intestine

2 nitrate ions from a dilute solution in soil into a more concentrated solution in root hair cells

3 water molecules from mesophyll cells into the air spaces of a leaf

For which examples must oxygen be present?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

7. Nov/2022/Paper_22/No.5

Some examples of substances moving across membranes are listed.

1 glucose molecules into the epithelium that lines the small intestine

2 nitrate ions from a dilute solution in soil into a more concentrated solution in root hair cells

3 water molecules from mesophyll cells into the air spaces of a leaf

For which examples must oxygen be present?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

8. Nov/2022/Paper_22/No.6

Plant tissue is placed in a solution.

What would cause plasmolysis of the plant cells?

1 the external solution having a higher water potential than the plant cells

2 the external solution having a lower water potential than the plant cells

3 water moving out of the plant cells

4 water moving into the plant cells

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

9. Nov/2022/Paper_23/No.5

Some examples of substances moving across membranes are listed.

1 glucose molecules into the epithelium that lines the small intestine

2 nitrate ions from a dilute solution in soil into a more concentrated solution in root hair cells

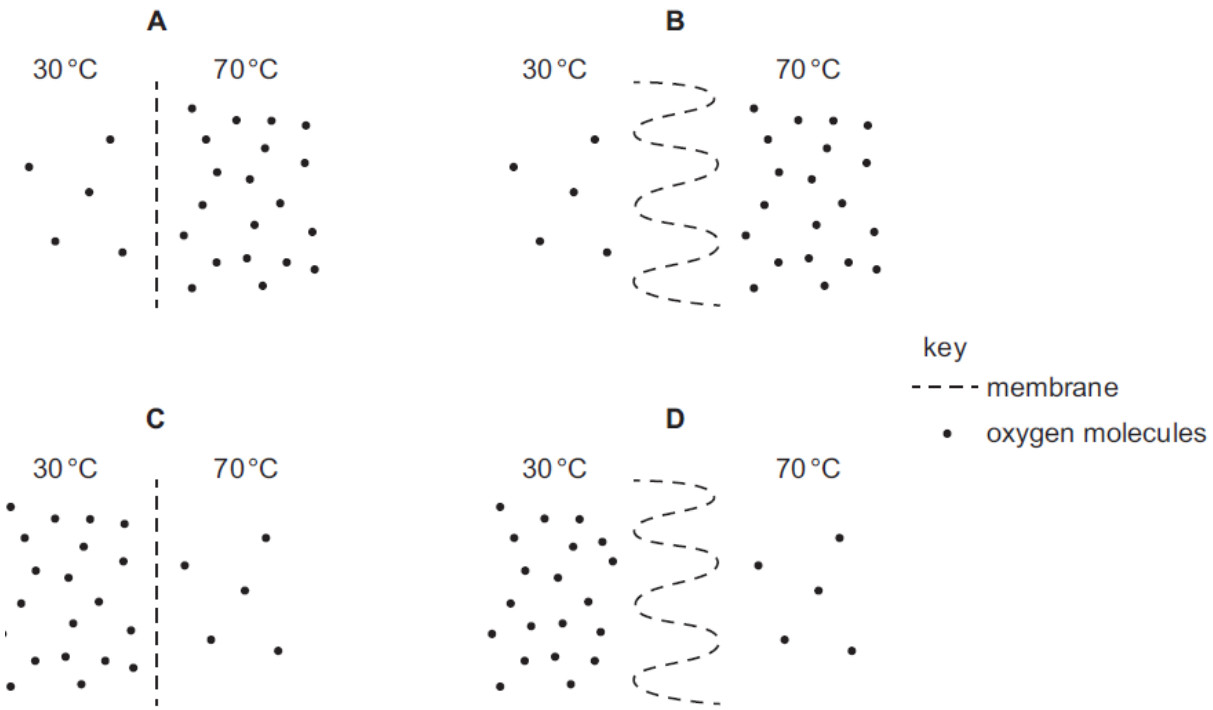
3 water molecules from mesophyll cells into the air spaces of a leaf

For which examples must oxygen be present?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

10. Nov/2022/Paper_23/No.6

In which diagram would most oxygen molecules diffuse across the membrane per minute?



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11. Nov/2022/Paper_32/No.2(b)

(b) Table 2.2 shows some of the features of diffusion, osmosis and active transport.

Place ticks (✓) in the boxes to show the correct features of each process.

Table 2.2

	requires energy from respiration	takes place against a concentration gradient	always involves the movement of water	substances can cross the cell membrane
diffusion				
osmosis				
active transport				

[4]

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Movement into and out of cells – 2021 IGCSE 0610

1. Nov/2021/Paper_11/No.7

Which words complete the definition of diffusion?

'Diffusion is the net movement of particles from a region of their ……1…... concentration to a region of their ……2…... concentration, ……3…... a concentration gradient.'

	1	2	3
A	higher	lower	up
B	higher	lower	down
C	lower	higher	up
D	lower	higher	down

2. Nov/2021/Paper_11/No.8

Cyanide is a poison that stops respiration. A paramecium is a single-celled freshwater organism.

What is the most likely effect of cyanide in a paramecium?

A increased active transport

B decreased osmosis

C decreased active transport

D increased osmosis

3. Nov/2021/Paper_12/No.7

Which statement about diffusion is correct?

A The process requires energy from respiration.

B The particles must cross a cell membrane.

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

D The process involves the random movement of particles.

4. Nov/2021/Paper_12/No.8

The cells in a plant root have a higher concentration of magnesium ions than in the surrounding soil.

Which process will move the magnesium ions into the root?

A active transport

B diffusion

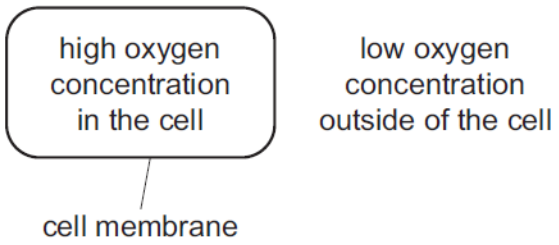
C osmosis

D transpiration

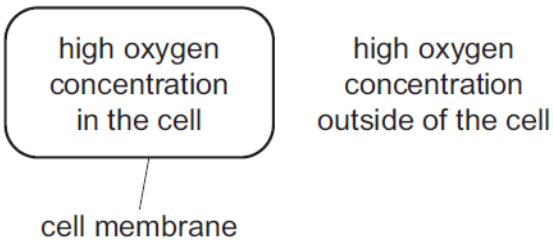
5. Nov/2021/Paper_13/No.7

In which diagram would oxygen diffuse into the cell?

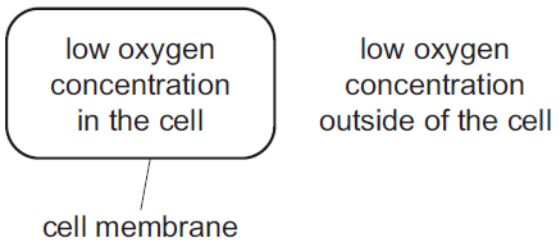
A



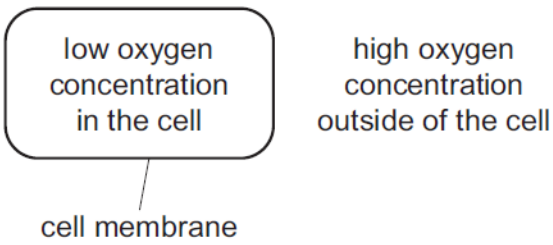
B



C



D



6. Nov/2021/Paper_13/No.8

Which statement about the role of the pressure of water in supporting plants is correct?

A The pressure of water inside the cells presses inwards on the cell wall.

B The pressure of water outside the cells presses inwards on the cell wall.

C The pressure of water inside the cells presses outwards on the cell wall.

D The pressure of water outside the cells presses outwards on the cell wall.

7. Nov/2021/Paper_21/No.6

Which statement about turgor pressure is correct?

A It creates a pull in the xylem which allows water to move upwards.

B It allows sucrose and amino acids to travel upwards and downwards in the phloem.

C It is a pressure that is only found in cells containing chloroplasts.

D It is pressure that helps to provide support for plants.

8. Nov/2021/Paper_21/No.7

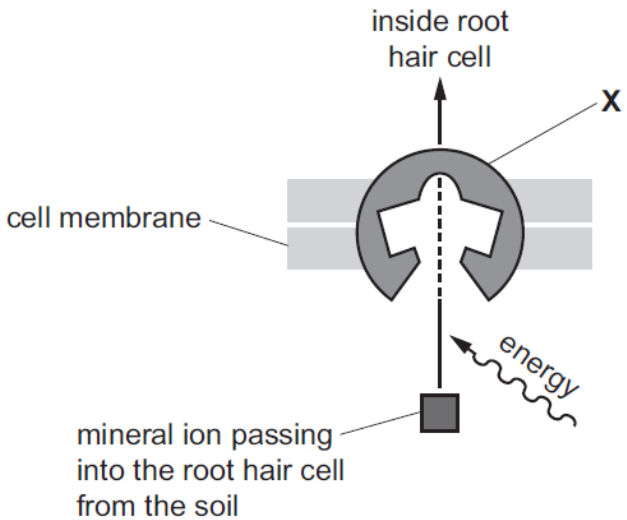
Which words complete the definition of diffusion?

'Diffusion is the net movement of particles from a region of their ……1…… concentration to a region of their ……2…… concentration, ……3…… a concentration gradient.'

	1	2	3
A	higher	lower	up
B	higher	lower	down
C	lower	higher	up
D	lower	higher	down

9. Nov/2021/Paper_22/No.7

The diagram shows the uptake of mineral ions by root hair cells.



Which type of molecule is labelled **X** in the diagram?

A glucose

B lipid

C protein

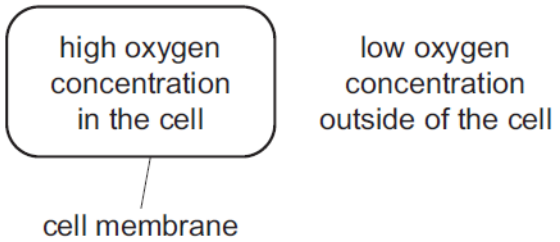
D starch

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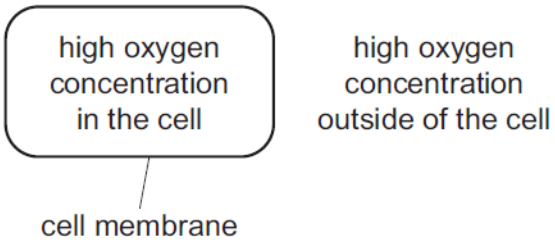
10. Nov/2021/Paper_23/No.6

In which diagram would oxygen diffuse into the cell?

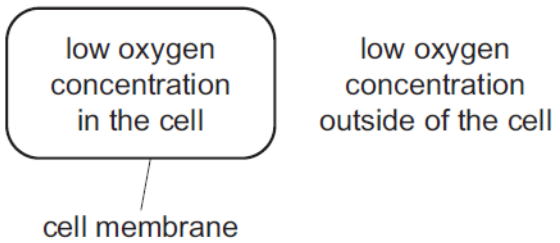
A



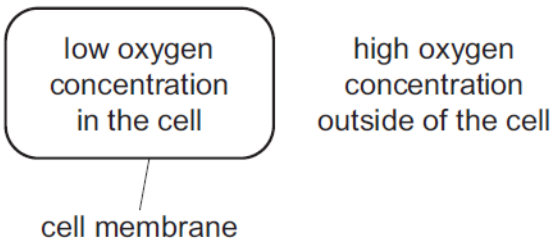
B



C



D



11. Nov/2021/Paper_23/No.7

Which statement about the role of the pressure of water in supporting plants is correct?

A The pressure of water inside the cells presses inwards on the cell wall.

B The pressure of water outside the cells presses inwards on the cell wall.

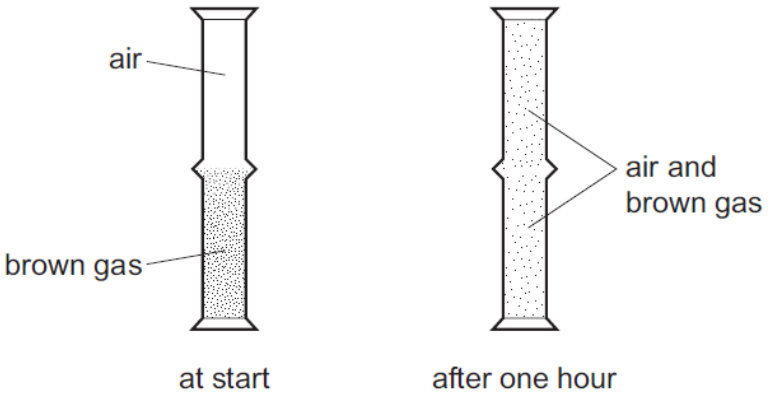
C The pressure of water inside the cells presses outwards on the cell wall.

D The pressure of water outside the cells presses outwards on the cell wall.

Movement into and out of cells – 2021 IGCSE 0610

1. March/2021/Paper_12/No.7

A jar of air was placed upside down on top of a jar containing a brown gas as shown.



Which process has taken place?

A diffusion both upwards and downwards

B diffusion downwards only

C diffusion upwards only

D diffusion and osmosis

2. March/2021/Paper_12/No.8

Which row describes active transport?

	particles move through a cell membrane		energy from respiration needed
	from a region of	to a region of	
A	higher concentration	lower concentration	no
B	higher concentration	lower concentration	yes
C	lower concentration	higher concentration	no
D	lower concentration	higher concentration	yes

3. March/2021/Paper_32/No.7

(a) Fig. 7.1 is a diagram of the circulatory system.

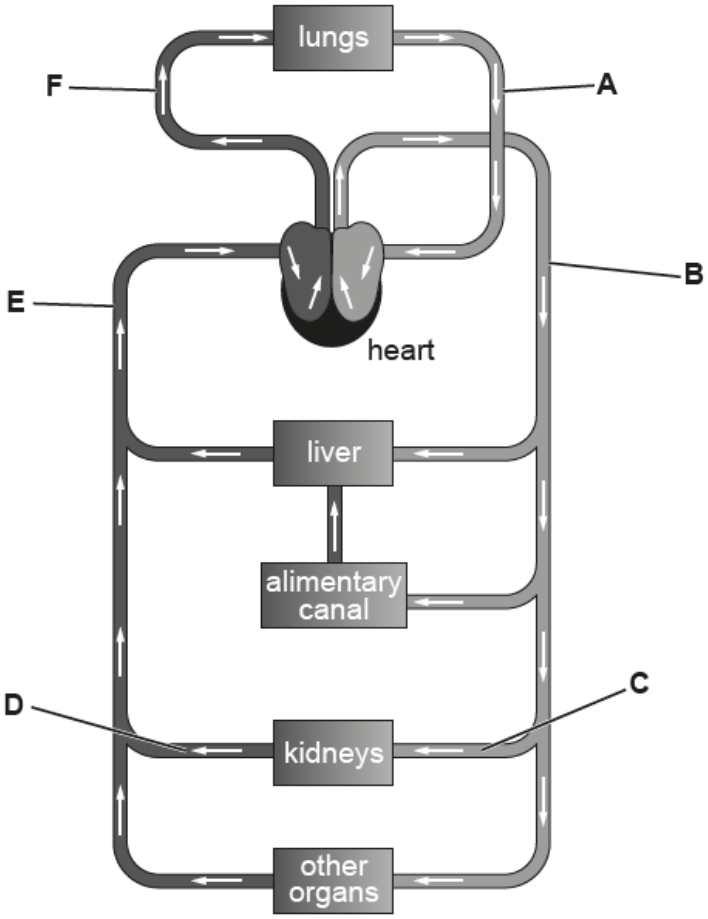


Fig. 7.1

(i) State the names of the blood vessels labelled **A**, **C** and **E** in Fig. 7.1.

A .....

C .....

E .....

[3]

(ii) State the letter in Fig. 7.1 that identifies the blood vessel that contains the highest oxygen concentration.

..... [1]

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(b) Describe **three** ways the structure of arteries differs from the structure of veins.

1 .....

.....

2 .....

.....

3.....

.....

[3]

(c) White blood cells are one of the components of blood.

(i) State **two** functions of white blood cells.

1 .....

2 .....

[2]

(ii) State **two other** main components of blood.

1 .....

2 .....

[2]

[Total: 11]

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4. March/2021/Paper_32/No.8

(a) Menstruation is the monthly loss of the lining of the uterus.

The age, in years, when the first menstruation occurred was recorded for one area.

Table 8.1 shows the results.

Table 8.1

age, in years, when the first menstruation occurred	number of females
8	3
9	15
10	62
11	212
12	298
13	251
14	173
15	18
16	11
17	1

(i) State the most common age of first menstruation.

..... [1]

(ii) State the number of females that had their first menstruation at 15 years of age.

..... [1]

(b) Describe what happens to the lining of the uterus during a typical menstrual cycle between:

days 1 to 5 .....

.....

days 8 to 14 .....

.....

[2]

(c) Describe what happens in the ovary on day 14 in a typical menstrual cycle.

..... [1]

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(e) State **two** physical changes that occur in males **and** in females during puberty.

1 .....

2 .....

[2]

[Total: 8]

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5. June/2021/Paper_11/No.7

By which process do oxygen and carbon dioxide move between cells and capillaries?

A breathing

B diffusion

C excretion

D respiration

6. June/2021/Paper_11/No.8

A cylinder of potato tissue was placed in a beaker of very salty water. After one hour the mass of the potato cylinder had decreased.

Why did this happen?

A Salt entered the plant tissue by active transport.

B Salt left the plant tissue by osmosis.

C Water entered the plant tissue by active transport.

D Water left the plant tissue by osmosis.

7. June/2021/Paper_12/No.8

A cylinder of potato tissue was placed in a concentrated salt solution. After soaking for one hour the potato tissue was observed.

How will the potato tissue have changed after soaking for one hour?

A longer and firmer

B no change

C shorter and softer

D shorter and firmer

8. June/2021/Paper_13/No.7

By which process do oxygen and carbon dioxide move between cells and capillaries?

A breathing

B diffusion

C excretion

D respiration

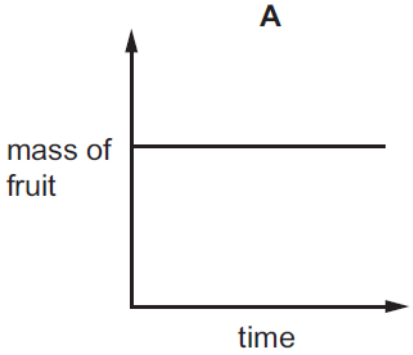
9. June/2021/Paper_13/No.8

Some students investigated osmosis.

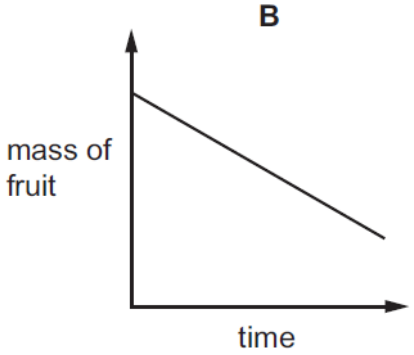
They placed some dried fruit into a beaker of distilled water. The mass of the fruit was measured at regular intervals during a 24-hour period.

Which graph shows the results?

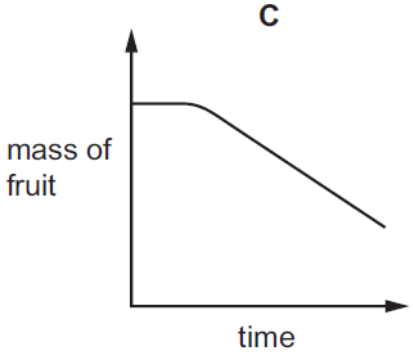
A



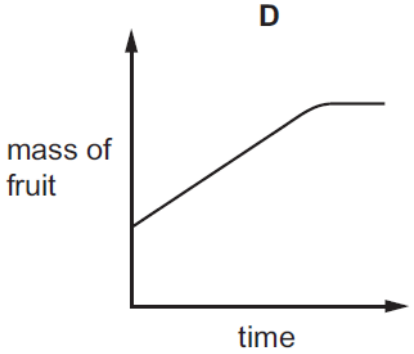
B



C



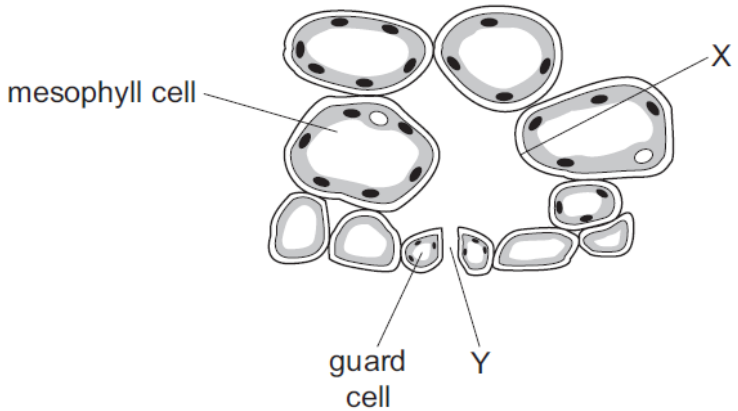
D



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10. June/2021/Paper_13/No.17

The diagram shows one of the stomata of a leaf, and some of the cells that are near it.



During transpiration, what describes the movement of water at X and at Y?

	movement of water at X	movement of water at Y
A	evaporation	diffusion
B	evaporation	osmosis
C	osmosis	diffusion
D	osmosis	osmosis

11. June/2021/Paper_21/No.7

By which process do oxygen and carbon dioxide move between cells and capillaries?

A breathing

B diffusion

C excretion

D respiration

12. June/2021/Paper_21/No.8

Which process is involved in the uptake of glucose by the epithelial cells of kidney tubules?

A active transport

B osmosis

C translocation

D transpiration

13. June/2021/Paper_22/No.15

Statements 1 to 4 describe stages in the development of cholera.

1 Chloride ions are secreted into the gut.

2 Osmosis causes water to move into the gut.

3 The infected person becomes dehydrated.

4 Toxins are produced by the pathogenic bacteria.

What is the correct sequence of the four stages?

A $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

B $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

C $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

D $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

14. June/2021/Paper_23/No.7

By which process do oxygen and carbon dioxide move between cells and capillaries?

A breathing

B diffusion

C excretion

D respiration

Movement into and out of cells – 2020 IGCSE 0610

1. Nov/2020/Paper_11/No.7

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

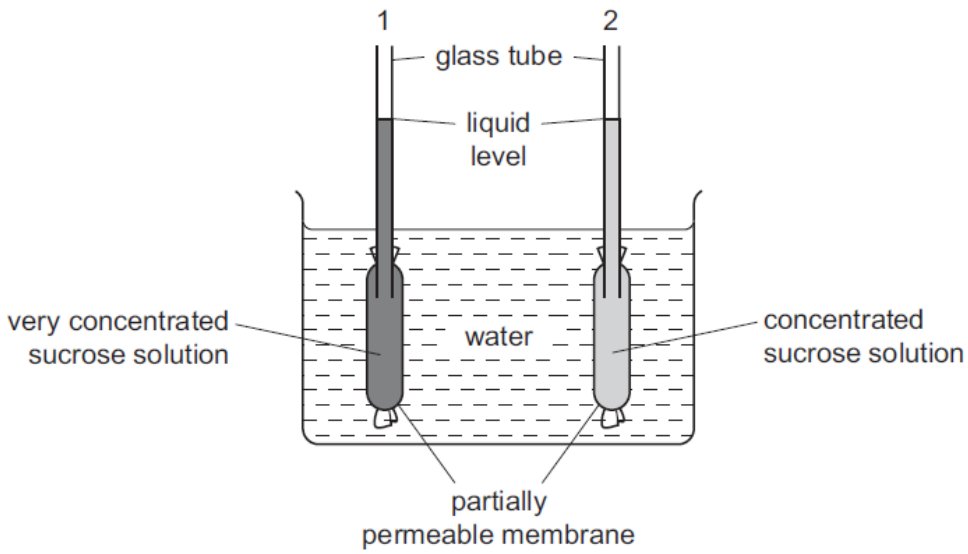
key

✓ = yes

✗ = no

2. Nov/2020/Paper_11/No.8

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

3. Nov/2020/Paper_12/No.7

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

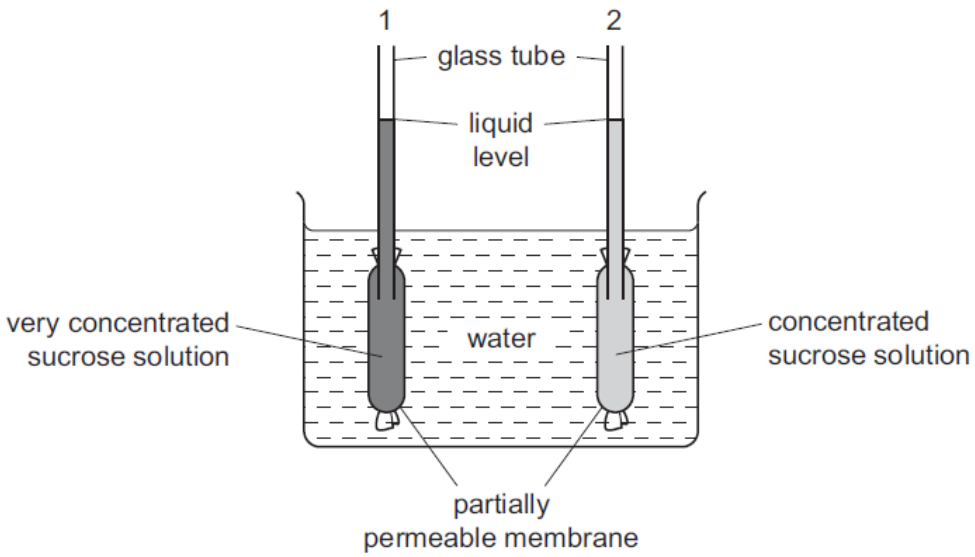
key

✓ = yes

✗ = no

4. Nov/2020/Paper_13/No.8

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

5. Nov/2020/Paper_13/No.7

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

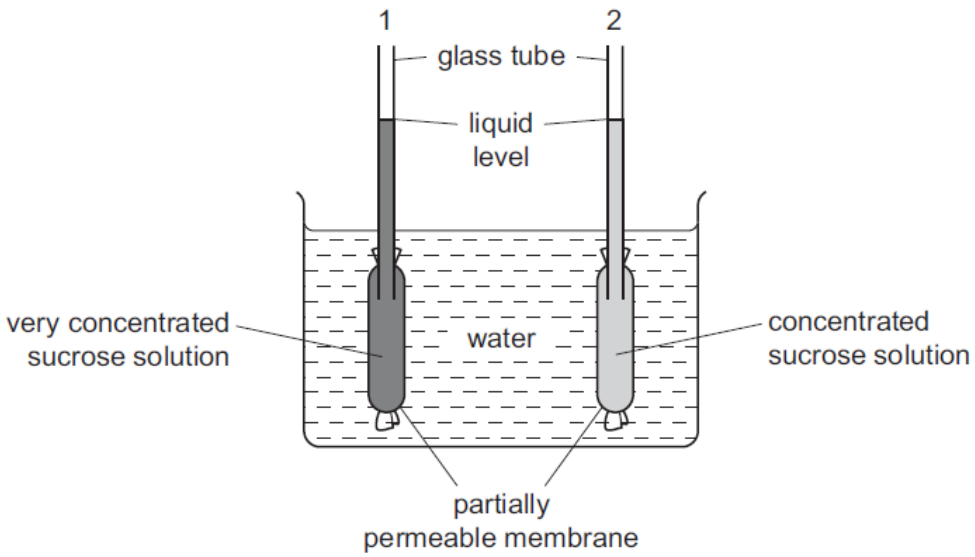
key

✓ = yes

✗ = no

6. Nov/2020/Paper_13/No.8

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

7. Nov/2020/Paper_21/No.5

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

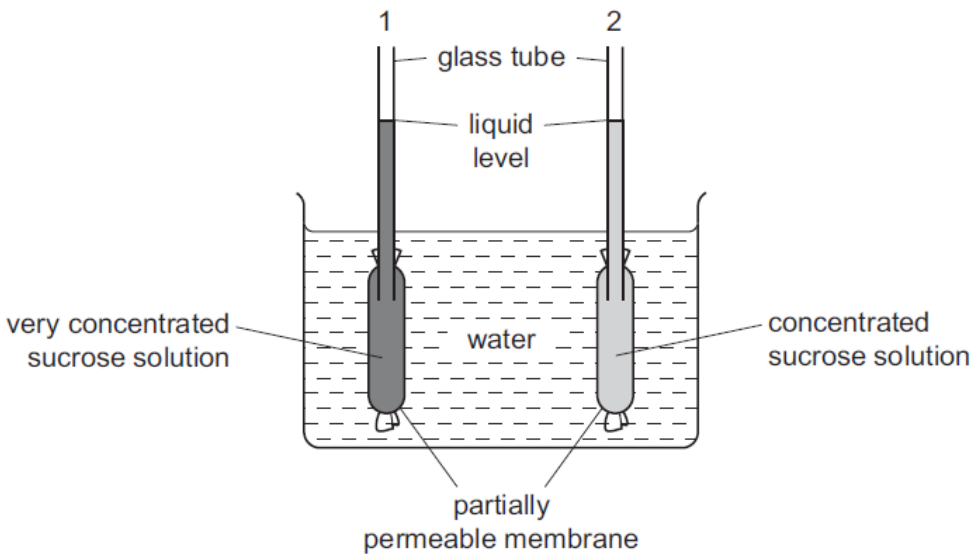
key

✓ = yes

✗ = no

8. Nov/2020/Paper_21/No.6

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

9. Nov/2020/Paper_22/No.5

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

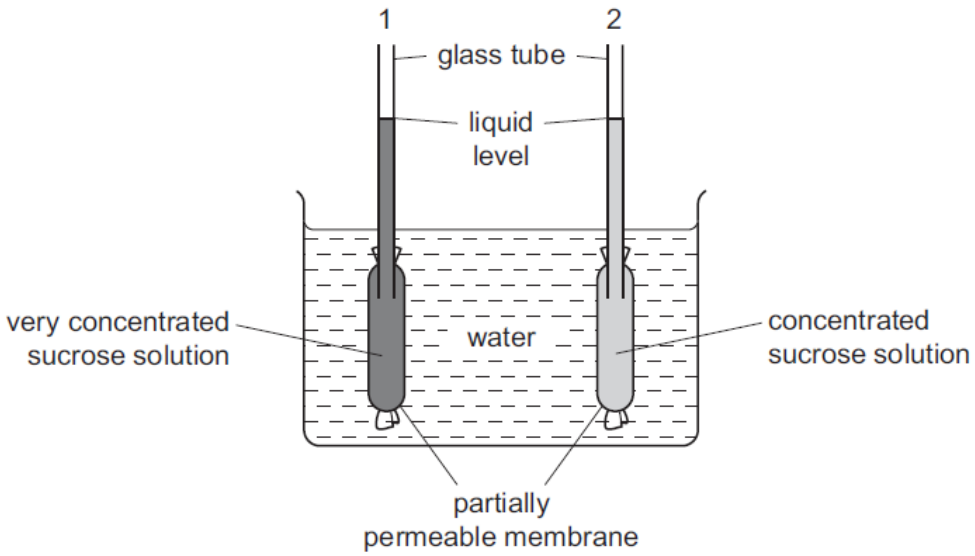
key

✓ = yes

✗ = no

10. Nov/2020/Paper_22/No.6

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

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11. Nov/2020/Paper_23/No.5

What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

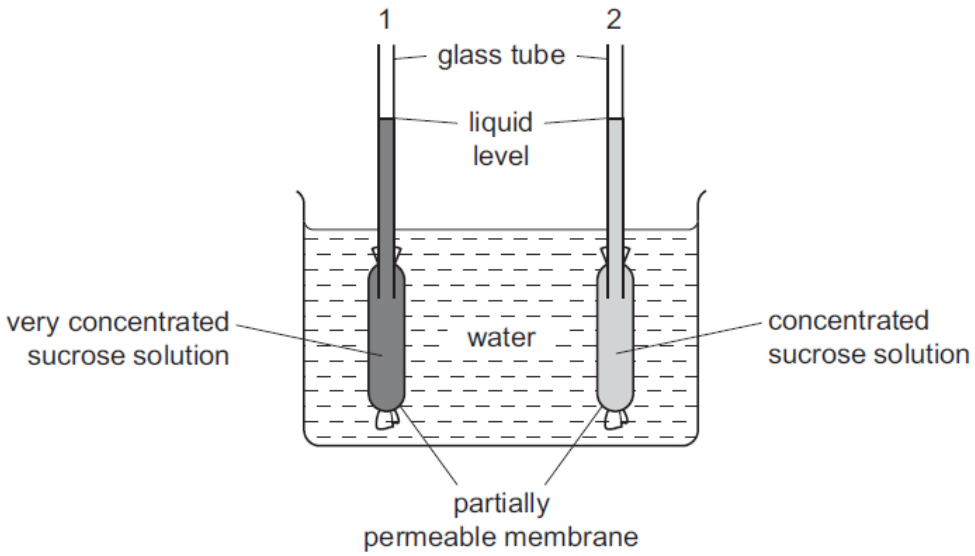
key

✓ = yes

✗ = no

12. Nov/2020/Paper_23/No.6

The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

Movement into and out of cells – 2020 IGCSE 0610

1. March/2020/Paper_12/No.7

Which row describes osmosis?

	movement of water	energy from respiration used	movement through a partially permeable membrane
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = yes

✗ = no

2. March/2020/Paper_12/No.8

A student made the following statements about the movement of ions by active transport.

1 It is the net movement of particles from a low concentration to a high concentration.

2 It is the net movement of particles from a high concentration to a low concentration.

3 It requires the use of energy from respiration.

4 It can only take place in living cells.

Which statements are correct?

A 1, 3 and 4 **B** 1 and 4 only **C** 2 and 4 only **D** 2 only

3. March/2020/Paper_22/No.7

Which row describes osmosis?

	movement of water	energy from respiration used	movement through a partially permeable membrane
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = yes

✗ = no

4. March/2020/Paper_22/No.8

A student made the following statements about the movement of ions by active transport.

1 It is the net movement of particles from a low concentration to a high concentration.

2 It is the net movement of particles from a high concentration to a low concentration.

3 It requires the use of energy from respiration.

4 It can only take place in living cells.

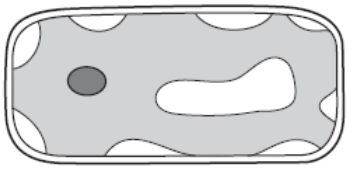
Which statements are correct?

A 1, 3 and 4 **B** 1 and 4 only **C** 2 and 4 only **D** 2 only

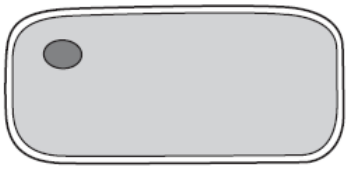
5. June/2020/Paper_11/No.6

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

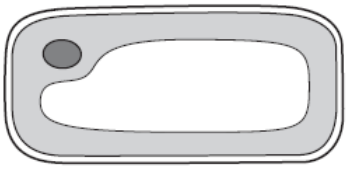
A



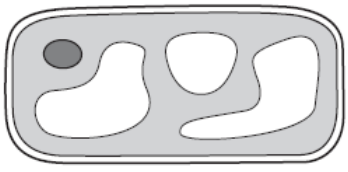
B



C

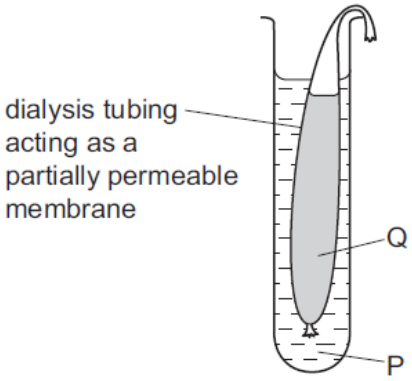


D



6. June/2020/Paper_11/No.7

The apparatus shown is used to demonstrate osmosis.



The mass of the dialysis tubing and contents was 11.2 g at the start of the demonstration and 9.4 g at the end.

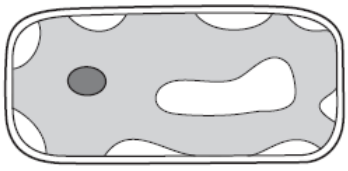
Which solutions would cause this change in mass?

	solution P	solution Q
A	5% salt solution	10% salt solution
B	10% salt solution	5% salt solution
C	water	5% salt solution
D	water	10% salt solution

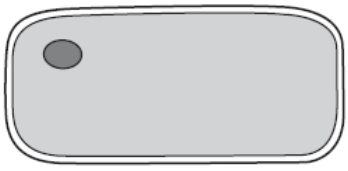
7. June/2020/Paper_12/No.6

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

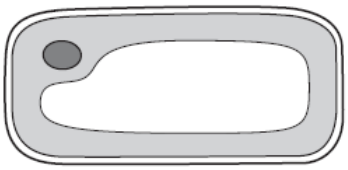
A



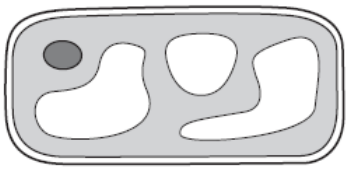
B



C



D



8. June/2020/Paper_12/No.7

Uncooked pieces of potato of identical size were placed in different liquids for one hour and then measured.

Which liquid will cause a decrease in the size of the piece of potato?

A pure water

B sugar solution less concentrated than the potato cell contents

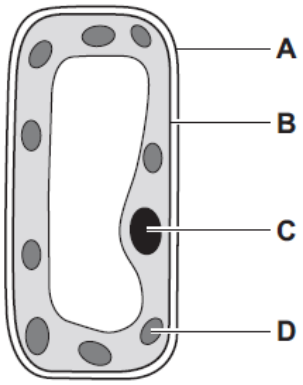
C sugar solution more concentrated than the potato cell contents

D sugar solution with the same concentration as the potato cell contents

9. June/2020/Paper_12/No.10

The diagram shows a plant cell.

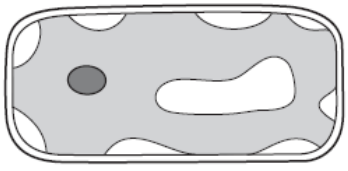
In which part of the cell does photosynthesis occur?



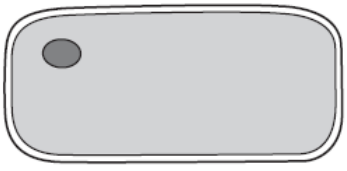
10. June/2020/Paper_13/No.6

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

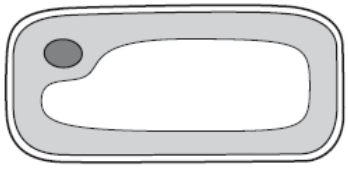
A



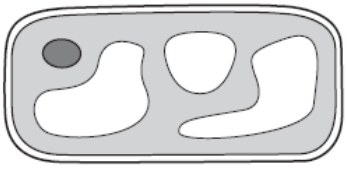
B



C



D



11. June/2020/Paper_13/No.7

Which statement about active transport is correct?

A Particles move into cells using energy released by photosynthesis.

B Particles move across a cell wall without using energy.

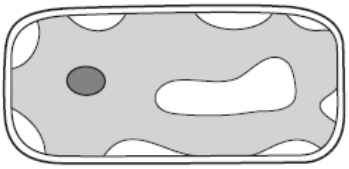
C Particles move from a region of higher concentration to a region of lower concentration.

D Particles move across a cell membrane using energy released by respiration.

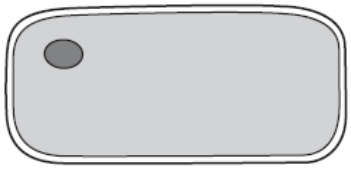
12. June/2020/Paper_21/No.5

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

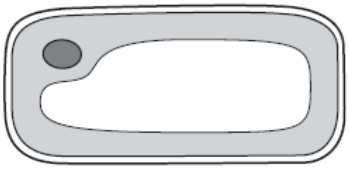
A



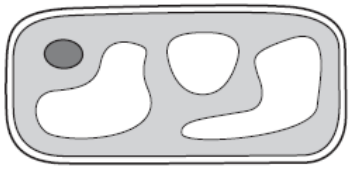
B



C



D



13. June/2020/Paper_21/No.6

Plant cells are placed in a solution with a higher water potential than the plant cell contents.

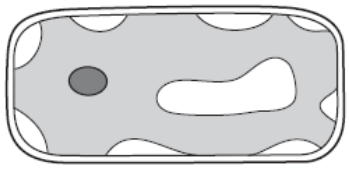
What will happen?

	direction of water movement	volume of vacuole
A	enters cells	decreases
B	enters cells	increases
C	leaves cells	decreases
D	leaves cells	increases

14. June/2020/Paper_22/No.5

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

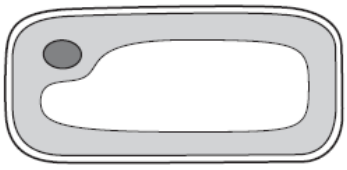
A



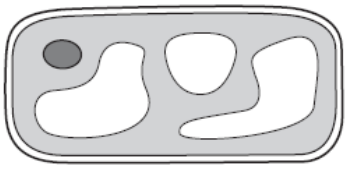
B



C



D



15. June/2020/Paper_22/No.6

An uncooked piece of potato was placed in a solution. After two hours the size of the piece of potato had decreased.

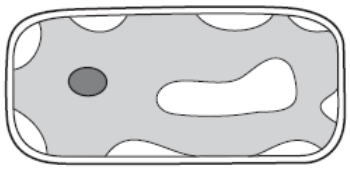
Which row explains why this has happened and how the potato cells have changed?

	water potential		potato cells become
	potato cells	external solution	
A	higher	lower	flaccid
B	higher	lower	turgid
C	lower	higher	flaccid
D	lower	higher	turgid

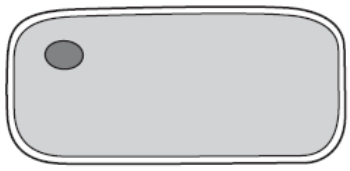
16. June/2020/Paper_23/No.5

Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?

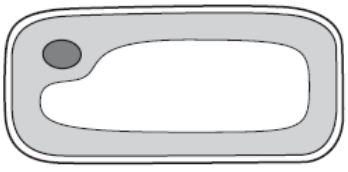
A



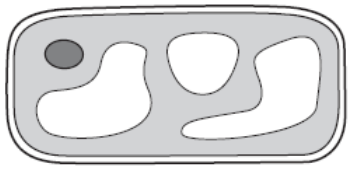
B



C



D



17. June/2020/Paper_23/No.3

Onion plant cells swell but do not burst when placed in distilled water.

Which cell component prevents the onion plant cells from bursting?

A cell membrane

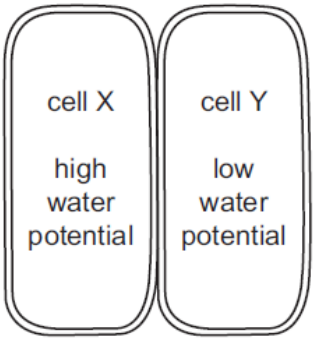
B cell wall

C nucleus

D vacuole

18. June/2020/Paper_23/No.6

The diagram shows two adjacent plant cells.



Which statement describes what will happen to the water in the cells?

A equal movement between cells

B net movement from X to Y

C net movement from Y to X

D no movement between cells

19. June/2020/Paper_41/No.3

(a) Dialysis tubing is an artificial membrane, which is similar to the lining of the intestine.

A student investigated the diffusion of glucose through dialysis tubing by using the apparatus shown in Fig. 3.1.

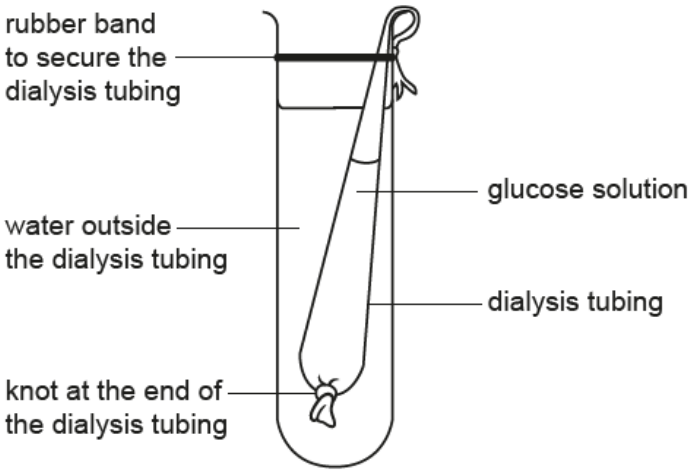


Fig. 3.1

The results are shown in Table 3.1.

Table 3.1

time/minutes	results of the Benedict's tests on the water outside the dialysis tubing
0	blue
5	green
10	yellow
15	red

(i) Describe and explain the results shown in Table 3.1.

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..... [3]

(ii) The student repeated the investigation with a higher concentration of glucose in the dialysis tubing.

Predict the results that the student would observe.

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..... [1]

(b) Fig. 3.2 shows a drawing of a cell from the lining of the small intestine. The lumen is the space inside the intestine where food is digested.

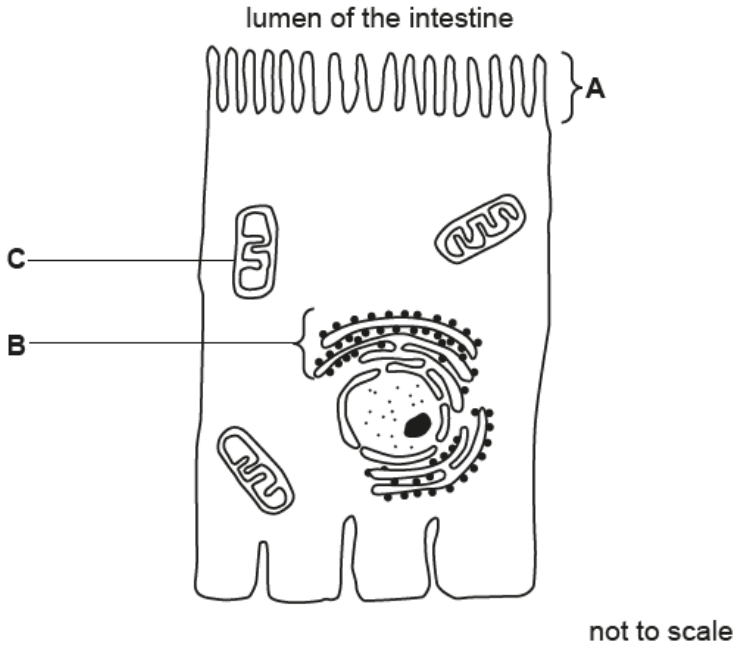


Fig. 3.2

State the names of the **three** labelled structures in Fig. 3.2 **and** describe the role of each structure in the intestinal cell.

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..... [6]

(c) The cholera bacterium can survive in the small intestine and the large intestine. The bacterium releases a toxin that interacts with receptors on the surface of cells.

Fig. 3.3 shows the effect of the toxin. The arrows indicate the direction of movement.

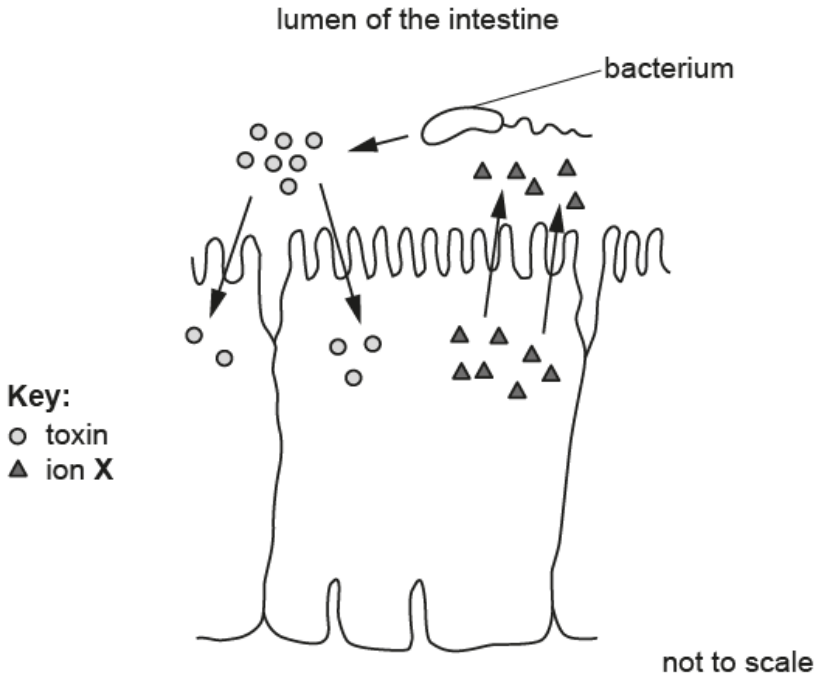


Fig. 3.3

The toxin stimulates the secretion of ion **X** out of the intestinal cell.

(i) State the name of ion **X**.

..... [1]

(ii) Describe the effects on the body of the secretion of ion **X** into the lumen of the intestine.

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.....

.....

..... [4]

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[Total: 15]

1. Active transport is the movement of

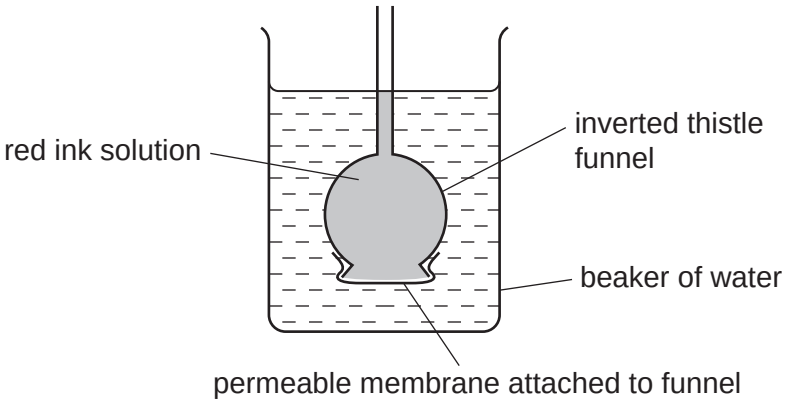
A molecules from a region of their higher concentration to a region of their lower concentration.

B particles from a region of lower concentration to a region of higher concentration using energy from respiration.

C urine by relaxation of a sphincter muscle in the bladder.

D water through a partially permeable membrane from a more dilute to a more concentrated solution.

2. The diagram shows an experiment to demonstrate the movement of molecules.



After one hour, the water in the beaker turned red.

What is the most likely reason for this colour change?

A Molecules of red ink move through the membrane by diffusion.

B Molecules of red ink move through the membrane by osmosis.

C Molecules of water move through the membrane by diffusion.

D Molecules of water move through the membrane by osmosis.

3. Why does oxygen diffuse into the blood from an alveolus in the lungs?

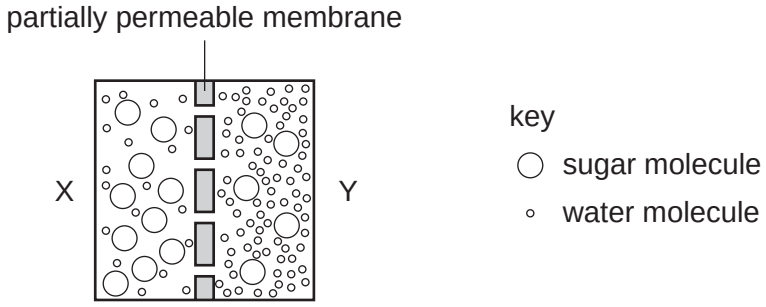
A The oxygen concentration in the alveolus is greater than the carbon dioxide concentration in the blood.

B The oxygen concentration in the alveolus is greater than in the blood.

C The oxygen concentration in the blood is greater than in the alveolus.

D The oxygen concentration in the blood is greater than the carbon dioxide concentration in the alveolus.

4. The diagram shows water and sugar molecules on either side of a partially permeable membrane.



What happens during osmosis?

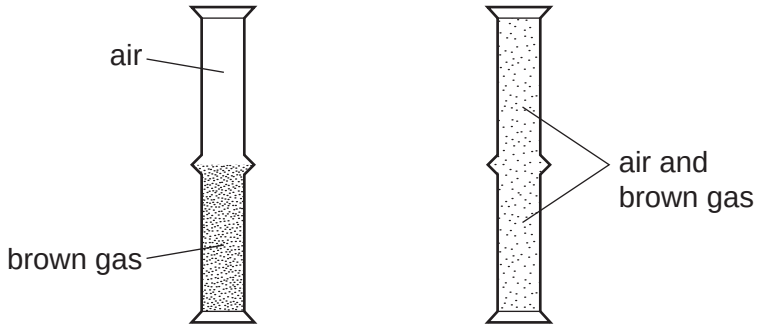
A More sugar molecules pass through the membrane from X to Y than from Y to X.

B More sugar molecules pass through the membrane from Y to X than from X to Y.

C More water molecules pass through the membrane from X to Y than from Y to X.

D More water molecules pass through the membrane from Y to X than from X to Y.

5. A jar of air was placed upside down on top of a jar containing a brown gas as shown.



Which process has taken place?

A diffusion both upwards and downwards

B diffusion downwards only

C diffusion upwards only

D diffusion and osmosis

6. Which statement describes how young plants are supported?

A the pressure of water inside the cells pressing outwards on the cell membranes

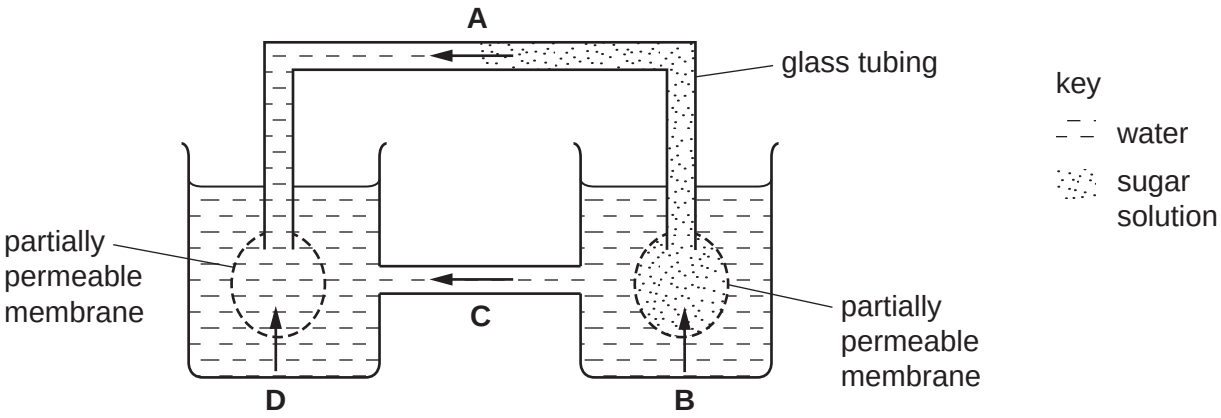
B the pressure of water inside the cells pressing outwards on the cell walls

C the pressure of water passing from the roots through the phloem

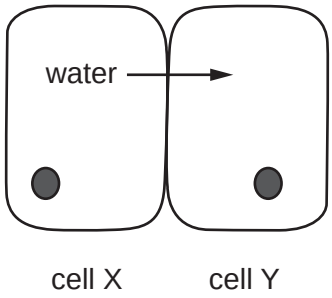
D the pressure of water passing from the roots through the xylem

7. The diagram shows an experiment on osmosis.

Which arrow shows the direction of the net movement of water at the start of the experiment?



8. The diagram shows two cells. The net movement of water is from cell X to cell Y.



What causes water to pass from cell X to cell Y?

A water potential is higher in cell X and active transport occurs

B water potential is higher in cell X and osmosis occurs

C water potential is lower in cell X and active transport occurs

D water potential is lower in cell X and osmosis occurs

9. Small molecules are used as the basic units in the synthesis of large food molecules.

Which statement is correct?

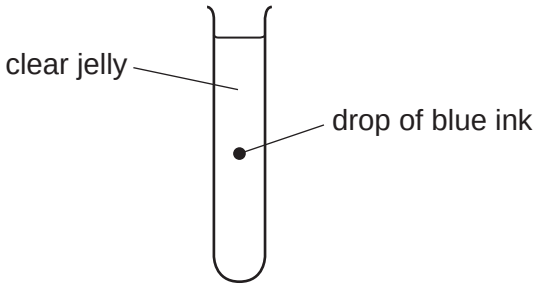
A Amino acids are basic units of carbohydrates.

B Fatty acids are basic units of glycogen.

C Glycerol is a basic unit of oils.

D Simple sugar is a basic unit of protein.

10. The diagram shows a test-tube containing clear jelly. A drop of blue ink is injected into the middle of the jelly.



The blue colour of the ink spreads throughout the jelly.

By which process does the blue ink spread through the jelly?

A active transport

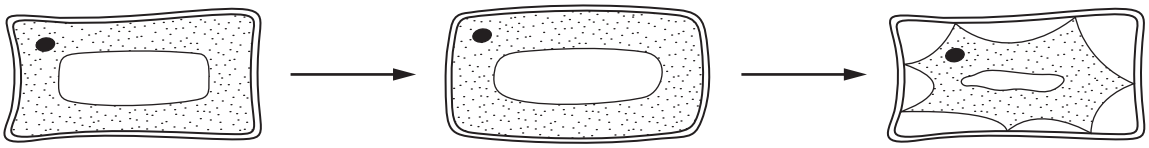
B catalysis

C diffusion

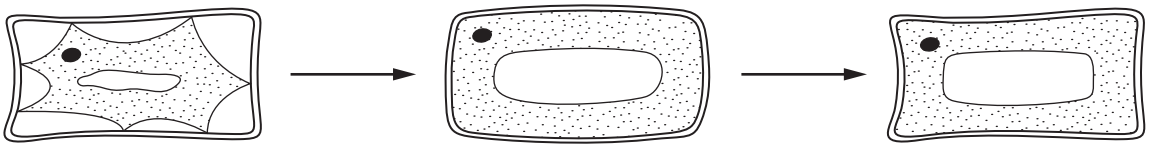
D osmosis

11. Which diagram shows the changes in appearance of a plant cell when it remains in a concentrated sugar solution for thirty minutes?

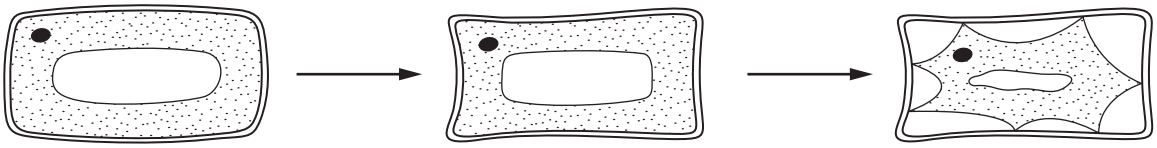
A



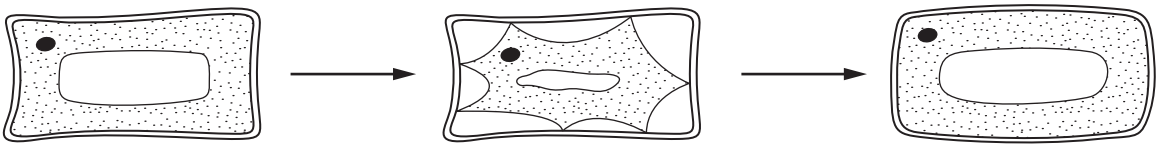
B



C



D



12. The data show the results of an investigation on osmosis using sticks of potato.

concentration of sugar solution / mol per dm^3	length of potato stick at start / mm	length of potato stick after 24 hours / mm
0.6	60	54

Which statements explain this change in length?

	movement of water	cause of the movement
A	into the potato cells	The sugar solution has a higher water potential than the potato cells.
B	into the potato cells	The sugar solution has a lower water potential than the potato cells.
C	out of the potato cells	The sugar solution has a higher water potential than the potato cells.
D	out of the potato cells	The sugar solution has a lower water potential than the potato cells.

13. What causes the diffusion of oxygen into a plant cell?

A active transport

B movement of molecules

C osmosis

D photosynthesis

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14. What is **not** an example of active transport?

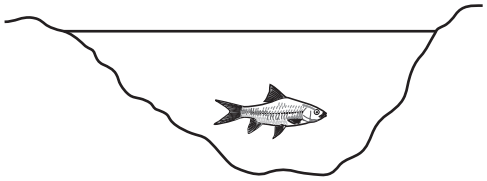
A absorption of water by root hairs

B reabsorption of glucose by kidney tubules

C uptake of glucose by villi

D uptake of ions by root hairs

15. The diagram shows a fish in a pond.



Why does oxygen diffuse from the air into the water before reaching the fish?

A Oxygen is more concentrated in the air than in the water.

B Oxygen is more concentrated in the water than in the air.

C Oxygen is needed by the fish for aerobic respiration.

D Oxygen is needed by the fish for anaerobic respiration.

16. Which structure provides the best surface for diffusion?

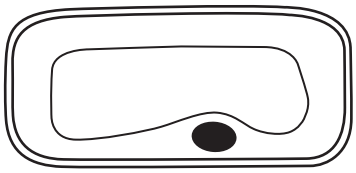
A atrium

B bronchioles

C ileum

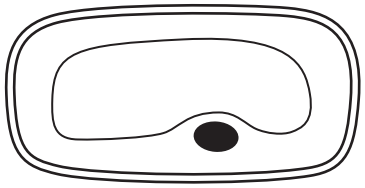
D trachea

17. The diagram shows a plant cell.

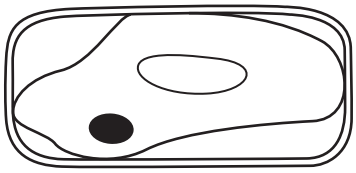


What is the appearance of this cell after it has been placed in pure water for 30 minutes?

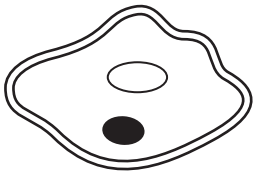
A



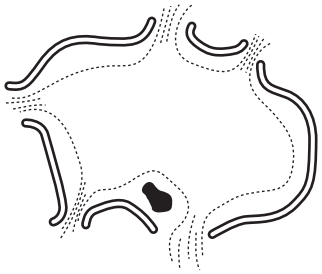
B



C



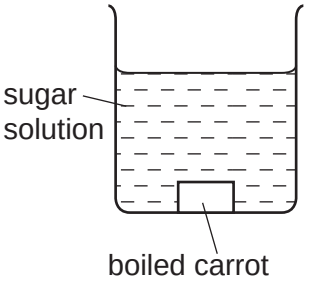
D



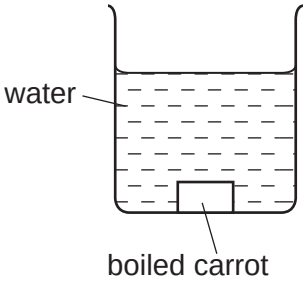
18. A student cuts out four pieces of carrot root of equal size. The pieces are treated as shown in the diagram, and then left for two hours.

After two hours, which piece of carrot will be the smallest?

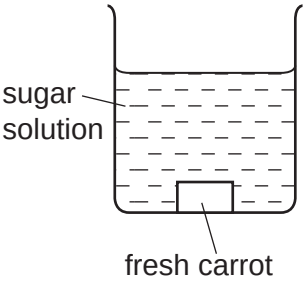
A



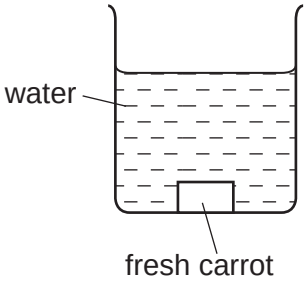
B



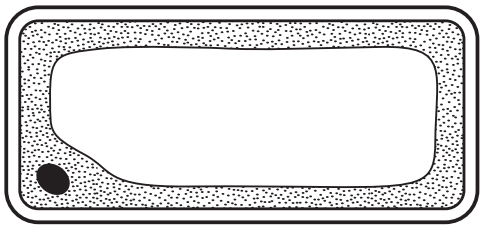
C



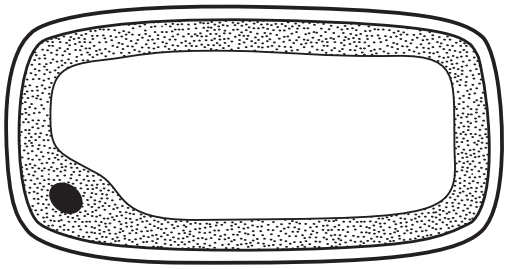
D



19. The diagrams show how a cell appears under the microscope at the start of an experiment and after it has been placed in a dilute solution of salts for 5 minutes.



start of the experiment



after placing in a dilute solution of salts

Which statement explains what happens?

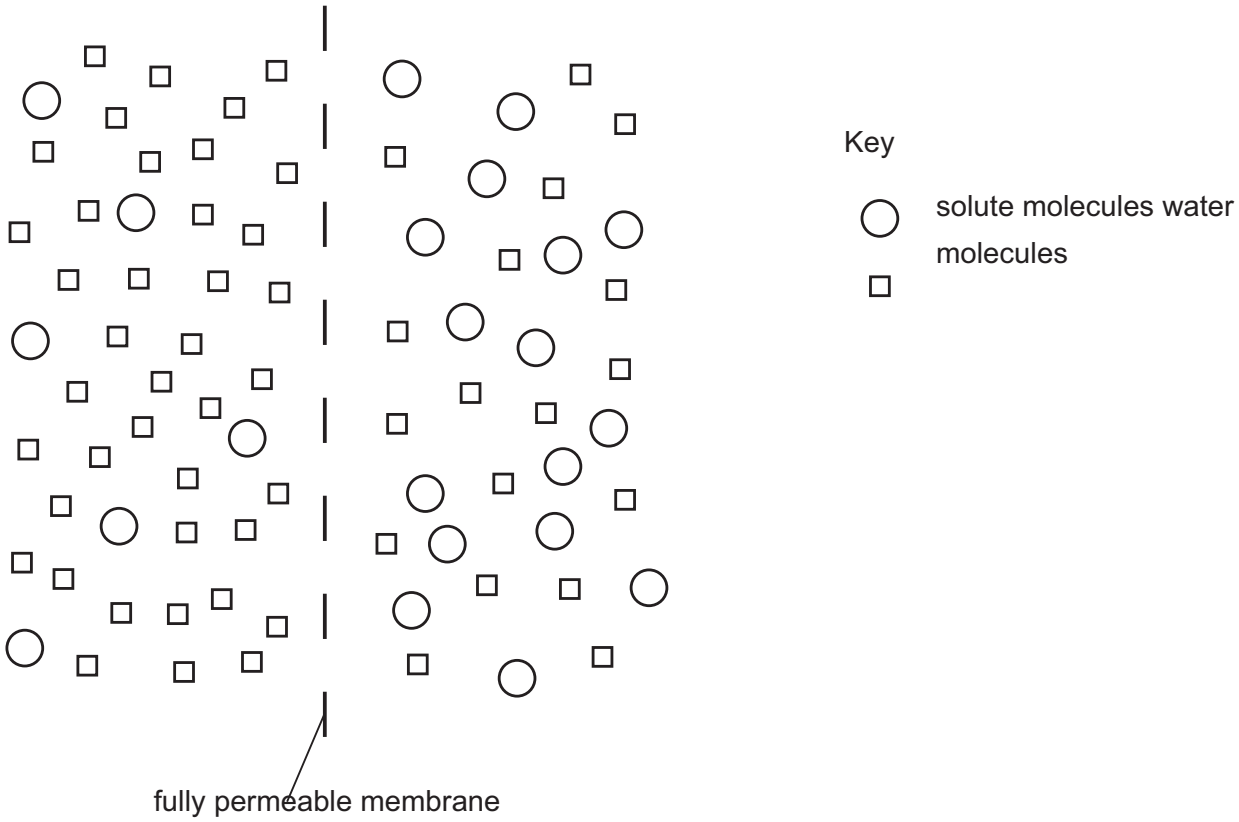
A Dissolved salts enter the cell by diffusion.

B Dissolved salts leave the cell by diffusion.

C Water enters the cell by osmosis.

D Water leaves the cell by osmosis.

20. The diagram represents the molecules in two solutions either side of a **fully permeable** membrane.



In which directions are the net movements of the molecules?

	solute molecules	water molecules
A	left to right	left to right
B	left to right	right to left
C	right to left	left to right
D	right to left	right to left

21. How do carbon dioxide and oxygen move in and out of a mesophyll cell?

A active transport

B diffusion

C respiration

D transpiration

22. During osmosis, which molecules move and through which type of membrane?

	molecules moving	type of membrane
A	oxygen	partially permeable
B	oxygen	permeable
C	water	partially permeable
D	water	permeable

23. Which process in humans does **not** use energy released from respiration?

A cell division

B diffusion of oxygen

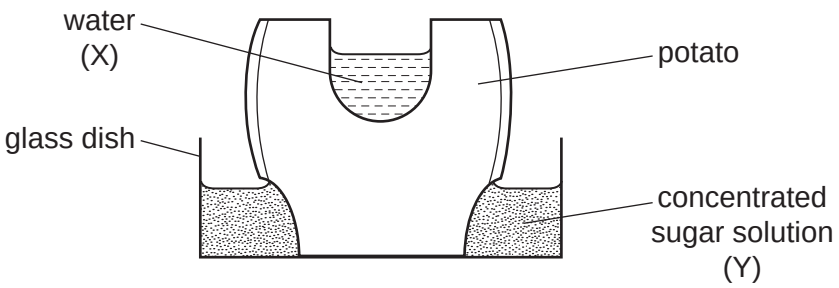
C muscle contraction

D protein synthesis

24. Which statements are correct for **both** diffusion and osmosis?

	involves movement of water only	requires energy from the cell	molecules move from higher concentration to lower concentration
A	✓	✓	✓
B	✓	✓	✗
C	✗	✗	✓
D	✗	✗	✗

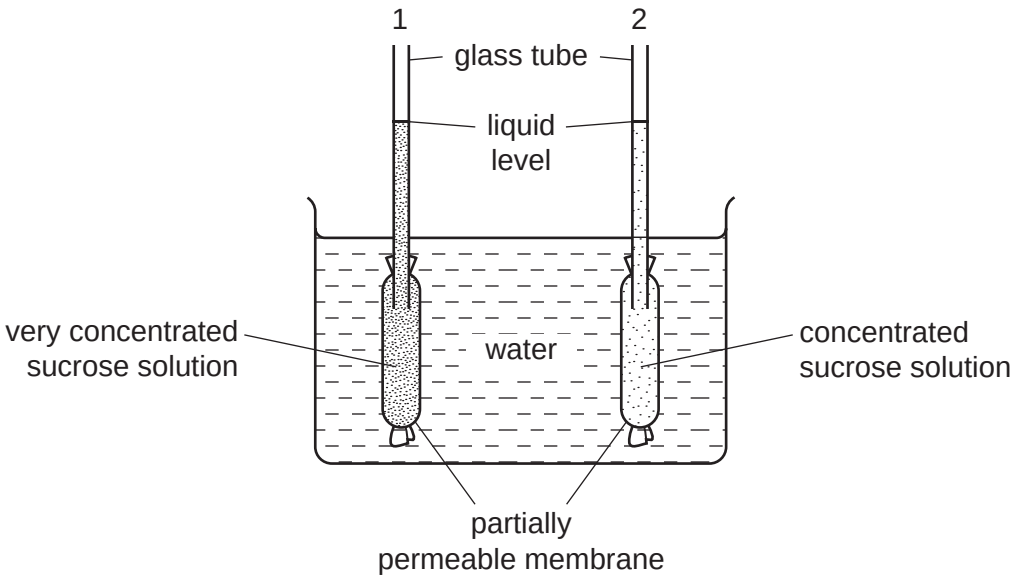
25. The diagram shows an experiment set up to investigate osmosis in living cells.



What happens to the volumes of water (X) and sugar solution (Y) after 12 hours?

	volume of water (X)	volume of sugar solution (Y)
A	decreases	increases
B	increases	increases
C	increases	remains the same
D	remains the same	decreases

26. The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	level in tube 1	level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

27. By which process does oxygen pass out of a leaf?

A diffusion

B osmosis

C translocation

D transpiration

28. Which characteristics are correct for **both** osmosis and diffusion?

	require a partially permeable membrane	require a concentration gradient	are energy consuming processes
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

29. How does oxygen move from the alveoli into the blood?

A by diffusion

B by evaporation

C by osmosis

D by transpiration

30. Which process occurs by osmosis?

A plant roots absorbing mineral ions from the soil

B plant roots absorbing water from the soil

C the small intestine absorbing fatty acids into the blood

D the small intestine absorbing glucose into the blood

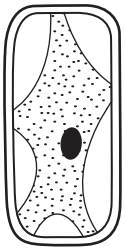
31. Red blood cells were placed in a dilute solution.

Movement of water across the cell membrane caused a change in their appearance.

What explains this movement?

	direction of water movement	from higher to lower water potential	from lower to higher water potential
A	in	✓	✗
B	in	✗	✓
C	out	✓	✗
D	out	✗	✓

32. The diagram shows a cell.



Which type of cell does the diagram show?

A an animal cell in a concentrated solution of salts

B an animal cell in pure water

C a plant cell in a concentrated solution of salts

D a plant cell in pure water

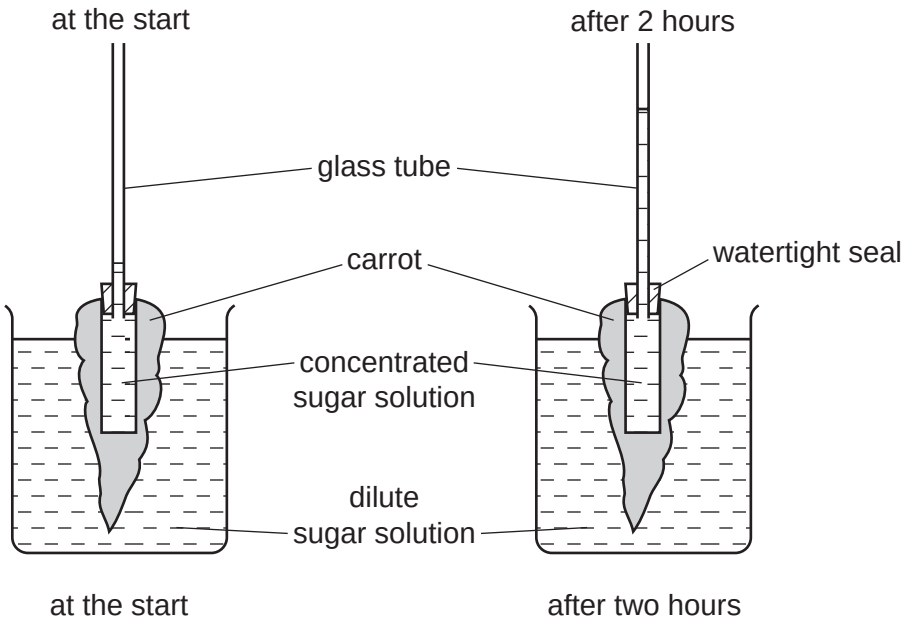
33. Two identical cylinders, 40 mm long, are cut from a potato. One (W) is placed in water and the other (X) is placed in a concentrated sugar solution.

What are the lengths of the cylinders after two hours?

	length of cylinder / mm	
	W	X
A	38	40
B	38	42
C	40	42
D	42	38

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34. The diagram shows the movement of a concentrated sugar solution up a glass tube. The glass tube is connected firmly to a hollowed-out carrot.



Why does the sugar solution in the glass tube rise?

A Sugar molecules move across the carrot tissue into the glass tube.

B Sugar molecules move across the carrot tissue into the beaker.

C Water molecules move across the carrot tissue into the glass tube.

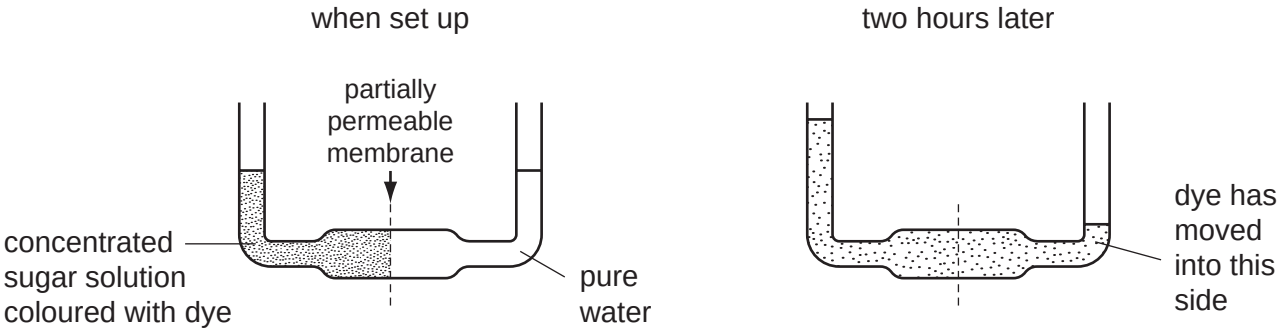
D Water molecules move across the carrot tissue into the beaker.

35. A plant absorbs water and oxygen into its roots.

How are these substances absorbed?

	water	oxygen
A	diffusion	transpiration
B	osmosis	diffusion
C	transpiration	osmosis
D	transpiration	transpiration

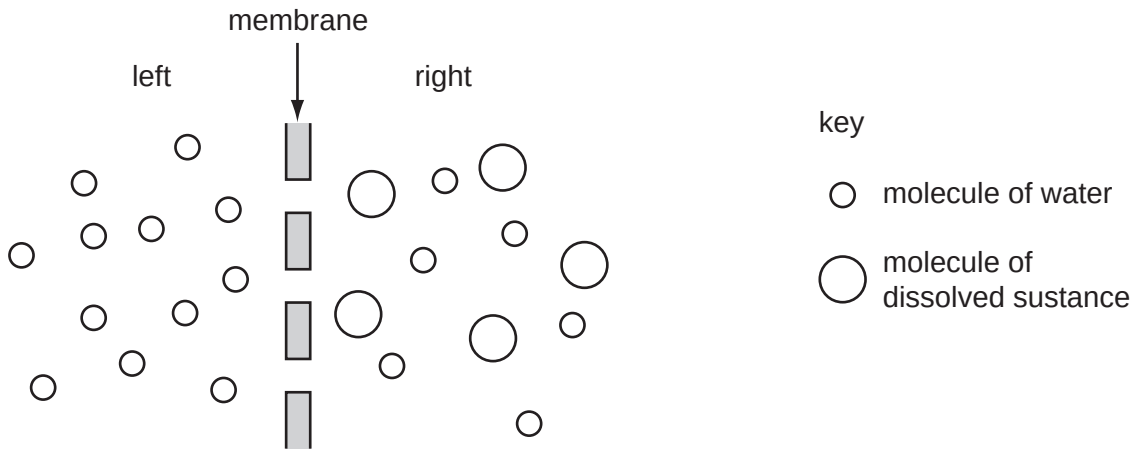
36. The diagrams show an experiment when set up and the same experiment two hours later.



What explains the movement of water and dye?

	movement of water	movement of dye
A	diffusion	osmosis
B	osmosis	diffusion
C	osmosis	translocation
D	translocation	diffusion

37. The diagram represents two liquids, separated by a membrane through which osmosis can occur.



What movement of molecules will occur?

A Molecules of dissolved substance move from left to right.

B Molecules of dissolved substance move from right to left.

C Overall, water molecules move from left to right.

D Overall, water molecules move from right to left.

38. The diagram shows part of a section through a leaf.

Which arrow shows the direction of movement of water by osmosis in a leaf?

