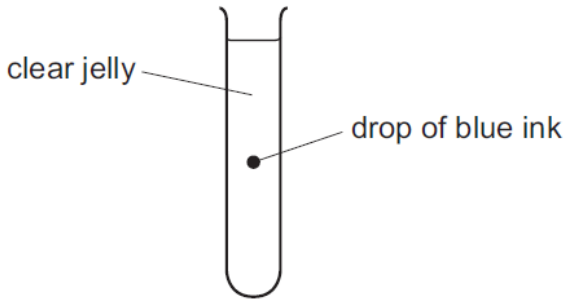
Movement into and out of cells – 2023 June IGCSE 0610

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

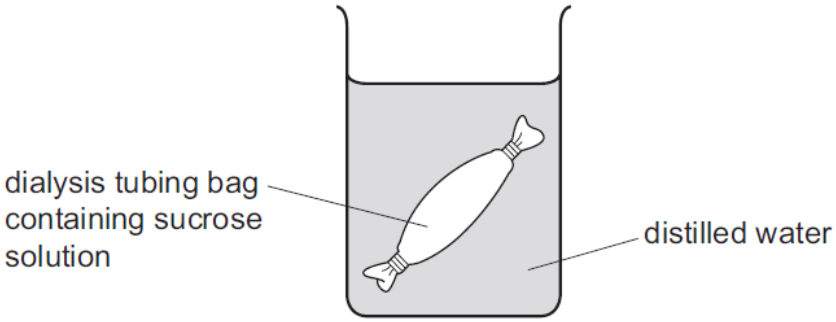
B catalysis

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

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

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	✗	✓	✓

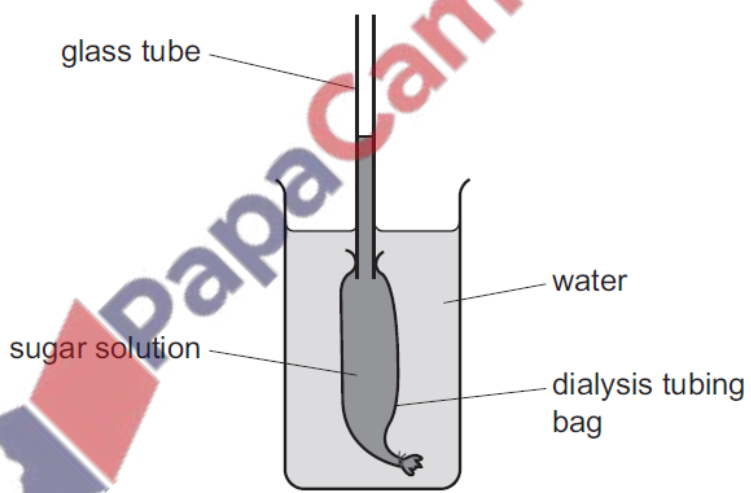
key

✓ = yes

✗ = no

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

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



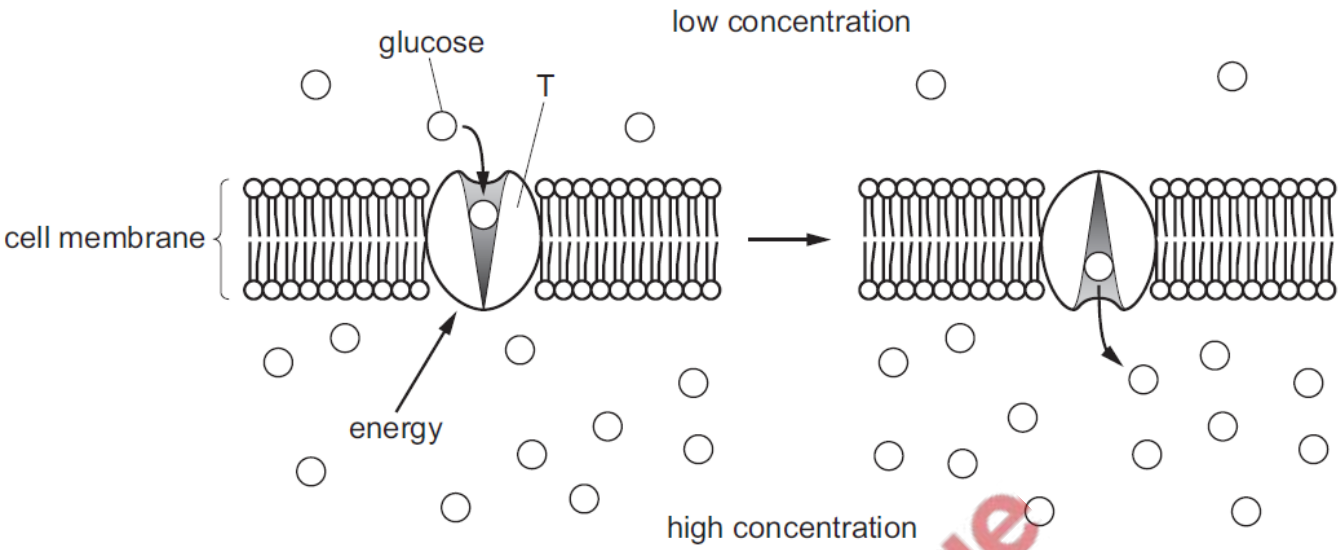
After 30 minutes, the level of the liquid in the glass tube goes .....1..... because the water had a .....2..... water potential than the sugar solution.

Which words correctly complete the statement?

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

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

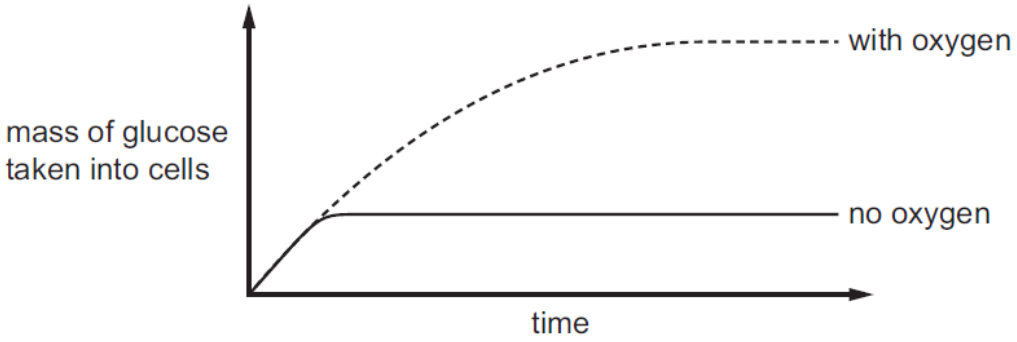
When a plant cell is put into pure water it .....1..... water by osmosis and becomes .....2..... .

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

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.

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.

(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]

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]

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]

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

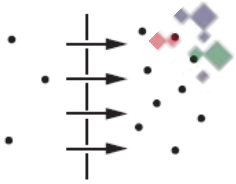
D water

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.

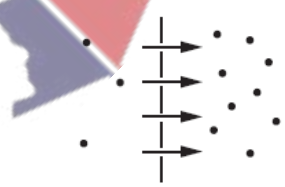
Which diagram shows active transport?

A



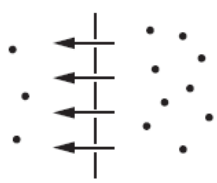
using energy from respiration

B



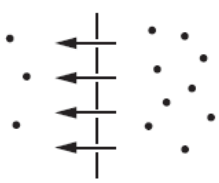
not using energy from respiration

C



using energy from respiration

D



not using energy from respiration