



National 5 Biology

Unit 1

Cell Biology

Ink Exercise Two

Cell Transport

Name: _____

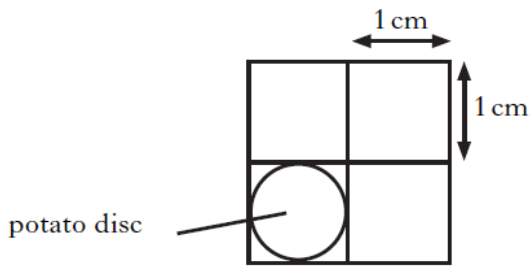
Class: _____

1. Four thin sections of onion tissue were immersed in 5% sugar solution. The sections were left for 15 minutes then viewed under a microscope. The table below shows the percentage of cells plasmolysed in each section.

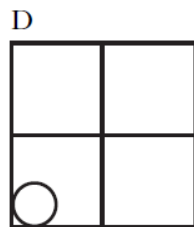
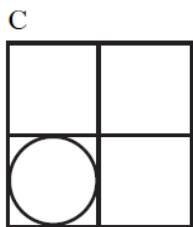
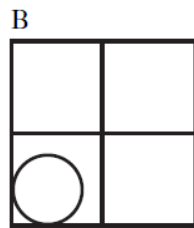
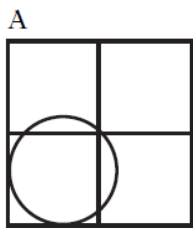
Section	Cells plasmolysed (%)
1	44
2	44
3	54
4	58

The average percentage of cells plasmolysed is

- 44
 - 50
 - 54
 - 200
2. The diagram below shows the initial diameter of a potato disc.



The potato disc was placed in a high water concentration for one hour. Which of the diagrams shows correctly the change in the diameter of the potato disc?



3. Which line in the table below identifies correctly the importance of diffusion to an animal cell

	<i>Raw material gained</i>	<i>Waste product removed</i>
A	Oxygen	Glucose
B	Carbon dioxide	Oxygen
C	Oxygen	Carbon dioxide
D	Glucose	Oxygen

4. Which of the following molecules can both diffuse through a cell membrane?

- Amino acids and starch
- Amino acids and water
- Starch and protein
- Protein and water

5. Four cylinders of potato tissue were weighed and each was placed into a salt solution of different concentration. The cylinders were reweighed after one hour.

The results are shown in the following table.

<i>Salt solution</i>	<i>Mass of potato cylinder (g)</i>	
	<i>Initial mass</i>	<i>Final mass</i>
A	10.0	12.6
B	10.0	11.2
C	10.0	9.4
D	10.0	7.0

In which salt solution would most potato cells be plasmolysed?

6. Carrier molecules involved in the process of active transport are made of

- Protein
- Carbohydrate
- Phospholipid
- Lipid

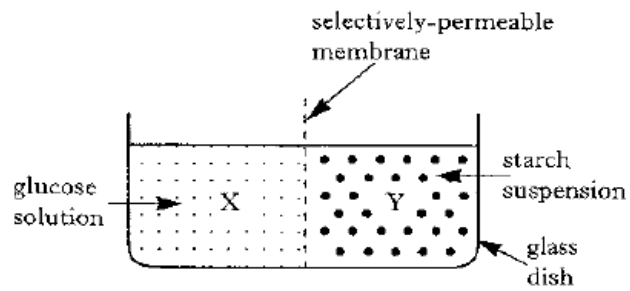
7. Red blood cells have a solute concentration of around 0.9%. Which of the following statements correctly describes the fate of these cells when immersed in a 1% salt solution?

- The cells will burst
- The cells will shrink
- The cells will expand but not burst
- The cells will remain unaffected

8. Which of the following describe passive transport?

	Direction	Energy
A	High-low	no
B	Low- high	no
C	High- low	yes
D	Low- high	yes

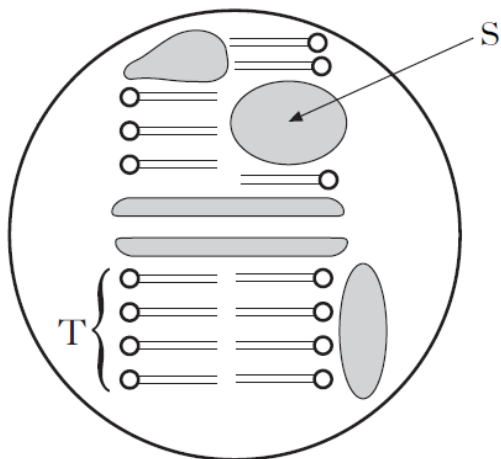
9. The following experiment was set up and left for 24 hours.



Which substance would be present in X and Y after the 24 hours?

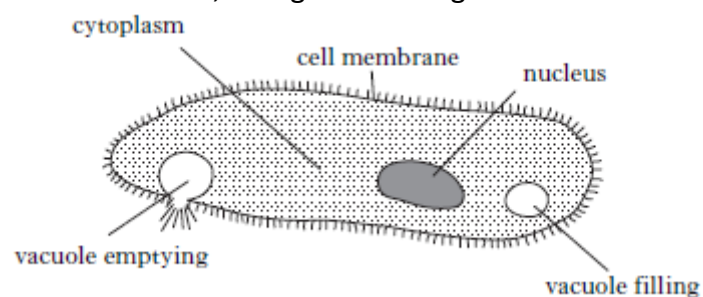
	X	Y
A	Glucose and starch	Glucose and starch
B	Glucose only	Glucose and starch
C	Glucose only	Starch only
D	Glucose and starch	Starch only

10. What are the correct labels for A and B



	S	T
A	protein	protein
B	protein	lipid
C	lipid	protein
D	lipid	lipid

11. The diagram below shows *Paramecium*, a single-celled organism which lives in water.



a) The water concentration outside the cell is **higher** than the water concentration of the cytoplasm. This causes water to enter the cell constantly.

1

i. What is the name for this movement of water?

ii. From the information given, state whether *Paramecium* is likely to live in fresh water or salt water.

1

b) *Paramecium* must get rid of excess water. Pure water is collected in the vacuoles by removing it from the cytoplasm. The vacuoles are emptied to the surrounding water as soon as they are full.

i. What would happen to the *Paramecium* cell if the vacuoles stopped working properly?

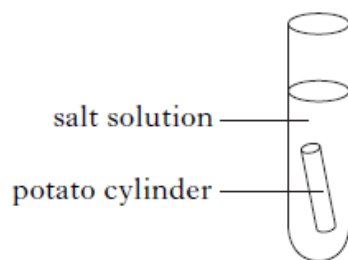
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ii. The vacuoles are not filled by the diffusion of water. What evidence is there to support this statement?

1

12. An investigation was carried out to find the effect of salt solutions of different concentrations on the mass of potato tissue.

Five test tubes were set up as shown below, each containing a different concentration of salt solution.



Each potato cylinder was weighed, placed in the solution and left for an hour.

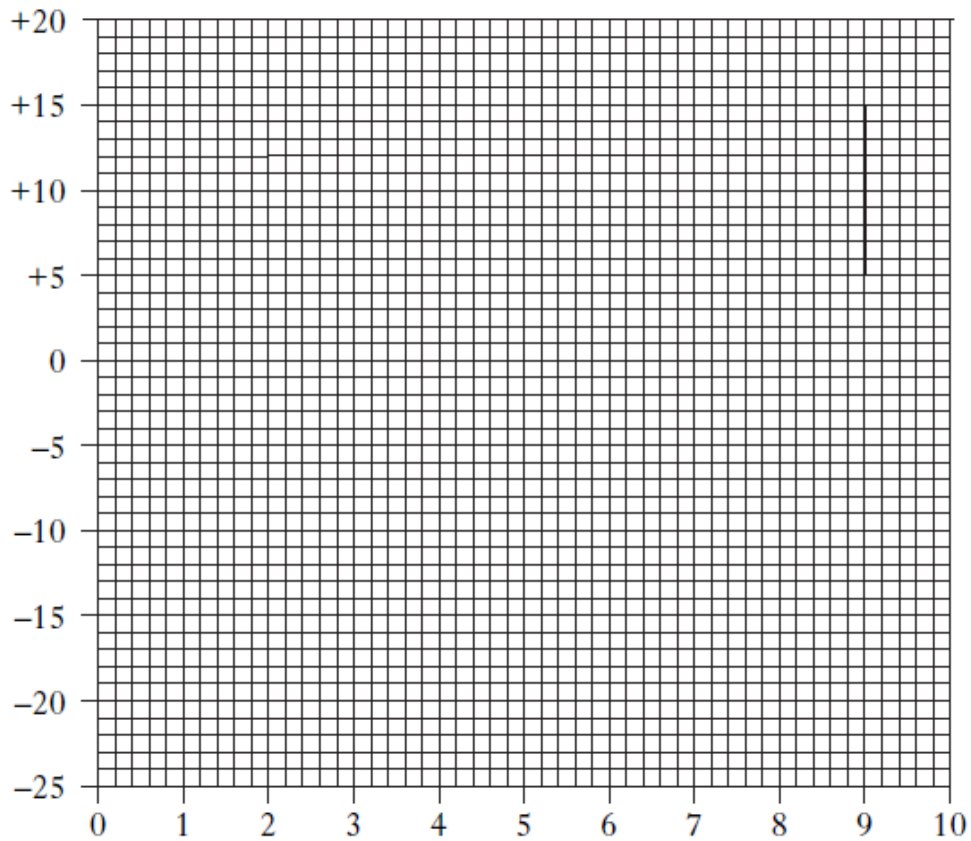
Each cylinder was then reweighed and the percentage (%) change in mass was calculated. The table below shows the results of the investigation.

<i>Salt concentration</i> (g/100cm ³)	<i>Change in mass (%)</i>
1	+15
3	+10
6	-5
8	-15
10	-20

a) Complete the graph overleaf by

- i. Adding an appropriate label to each axis
- ii. Construct a **line graph** using the results given in the table.

2



b) Time was kept constant in this investigation.

Name **two** other variables which must be kept constant.

1 _____

2 _____

1

c) Using the results given, state the salt concentration which is closest to the to the potato tissue. Explain your answer.

Salt solution concentration _____ g/100cm³

Explanation _____

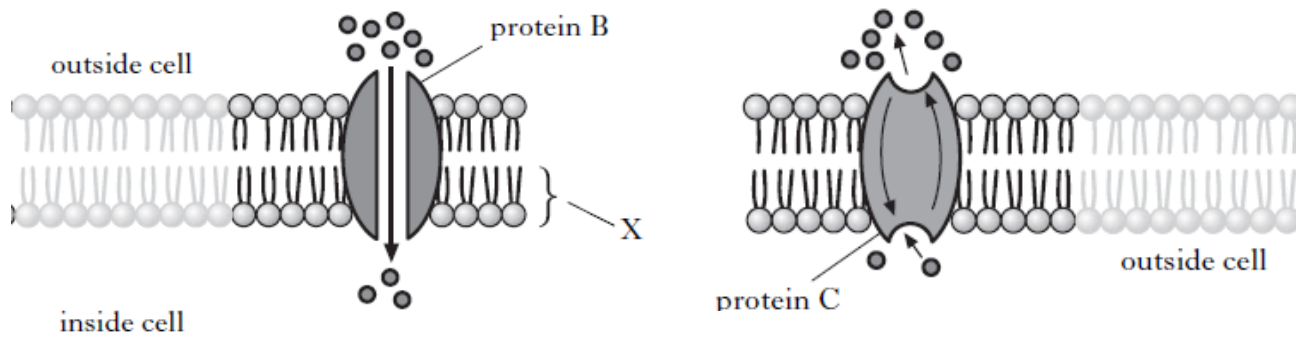
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d) Predict the salt concentration that would produce a 10% decrease in mass.

_____ g/100cm³

1

13. The diagram below shows some of the functions of proteins in the cell membrane.

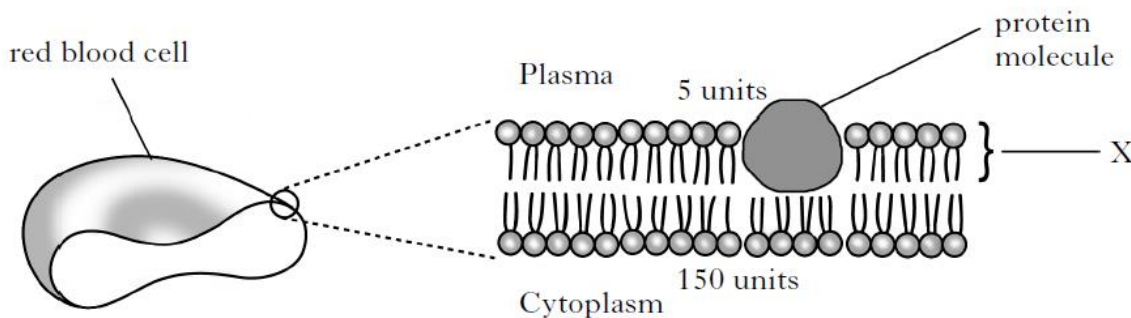


Use the information from the diagram to complete the table below.

<i>Protein</i>	<i>Function</i>
	Transports molecules by diffusion
	Transports molecules by active transport

1

14. The diagram below shows a magnified section of the cell membrane of a red blood cell. The numbers show the relative concentrations of potassium ions that are maintained on either side of the membrane.



a) Name molecule X.

1

b) Express, as a simple whole number ratio, the concentration of potassium ions inside and outside the cell.

Space for calculation

_____ : _____
inside outside

1

c) Use the information in the diagram to name the process by which potassium ions would leave the cell.

1

d) Name a factor which could limit the rate the potassium ions can leave the cell

1

Total

/25

Areas I need to work on: