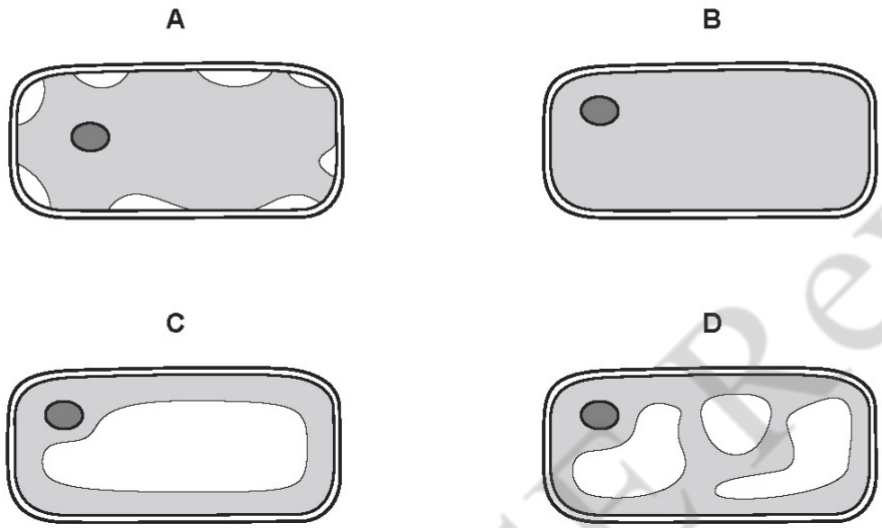
Biology – 0610

Movement in and out of cells [Question Paper]

1)

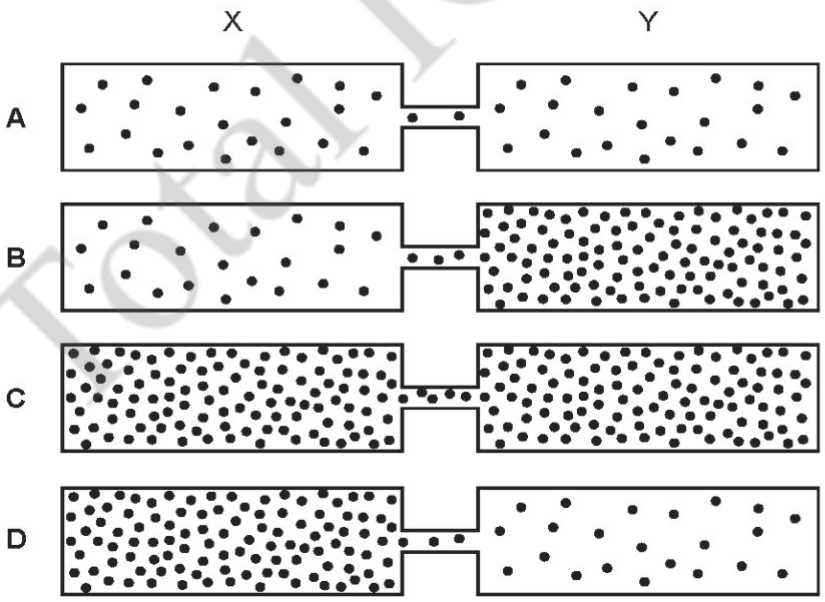
Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?



2)

The dots represent molecules of a gas in four tubes at the beginning of an experiment.

In which tube will more molecules move from X to Y than in the opposite direction?



3)

What increases the rate of diffusion of oxygen into red blood cells in the lungs?

A Air leaving the lungs is saturated with water vapour.

B Air leaving the lungs still contains 16% oxygen.

C Blood arriving in the lungs is saturated with oxygen.

D Blood is taken away from the lungs as it circulates.

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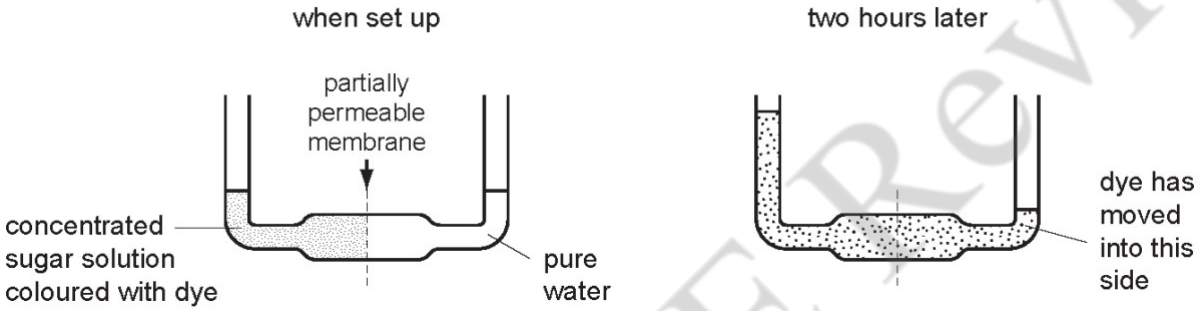
4)

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

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5)

On a dry, sunny day, how does water vapour move through the stomata of a leaf?

A into the leaf by diffusion

B into the leaf by osmosis

C out of the leaf by diffusion

D out of the leaf by osmosis

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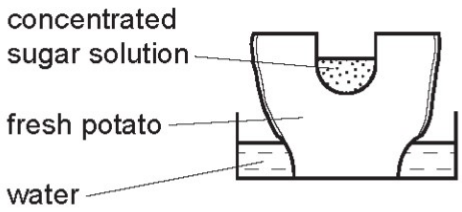
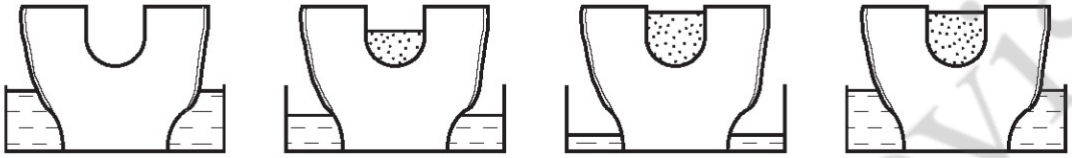
6)

The diagram shows an experiment using a potato.



Which shows the result of the experiment after 24 hours?

A B C D



7)

Water is a good solvent.

What does this mean?

A It dissolves well in many other substances.

B It flows easily through vessels.

C It is permeable to gases.

D Many substances dissolve well in it.

8)

A red blood cell is placed in a concentrated sugar solution.

What happens and why?

A The cell bursts as sugar molecules diffuse into it.

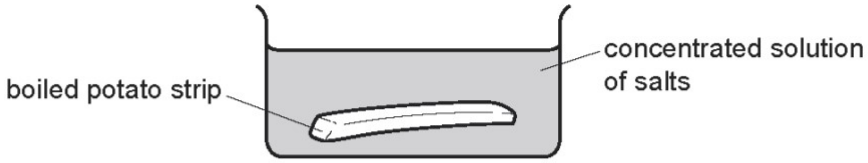
B The cell bursts because the concentrated sugar solution enters it.

C The cell shrinks because sugar molecules leave it.

D The cell shrinks because water leaves it.

9)

Boiling potatoes destroys their cell membranes. A peeled, boiled potato strip is placed in a concentrated solution of salts.



What takes place?

	osmosis	solute diffusion
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key:
✓ = takes place
✗ = does not take place

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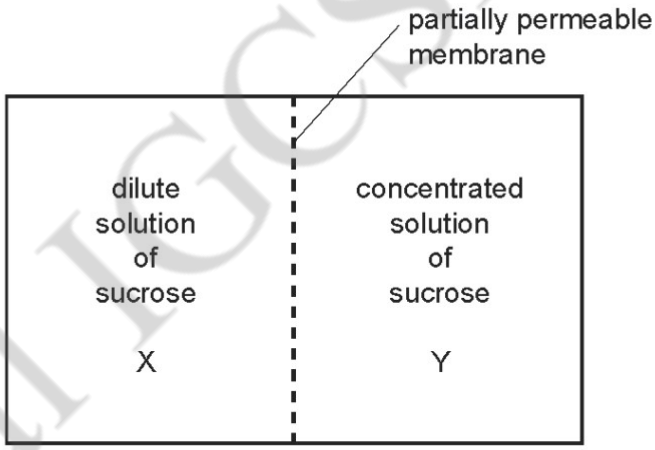
10)

The diagram shows two solutions that are separated by a partially permeable membrane.



In which direction will most water molecules move in relation to their concentration gradient?

A from X to Y against their concentration gradient

B from X to Y down their concentration gradient

C from Y to X against their concentration gradient

D from Y to X down their concentration gradient

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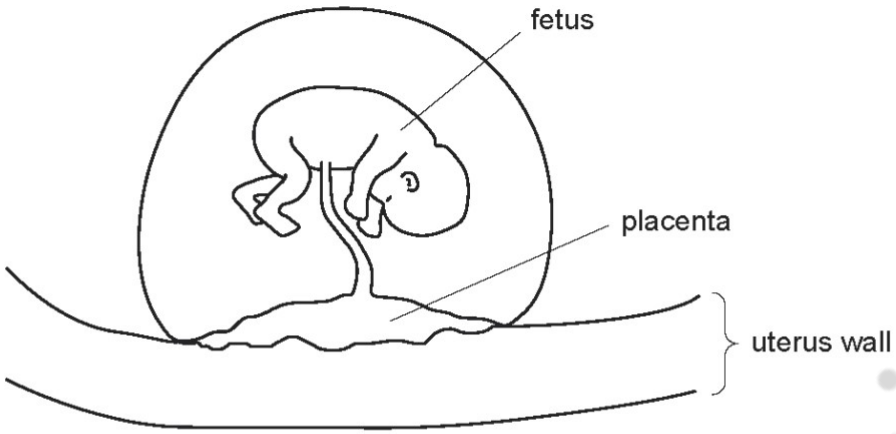
11)

The diagram shows a fetus attached by the placenta to the uterus wall of the mother.



By which process do all substances pass between the fetus and the mother in the placenta?

A diffusion

B nutrition

C osmosis

D respiration

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12)

What happens in osmosis?

A movement of solute molecules against their concentration gradient

B movement of solute molecules down their concentration gradient

C movement of water molecules against their concentration gradient

D movement of water molecules down their concentration gradient

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13)

Which structures **must** be present in a cell for osmosis to take place?

A cell (sap) vacuole and cell wall

B cell wall and cell membrane

C chloroplast and cytoplasm

D cytoplasm and cell membrane

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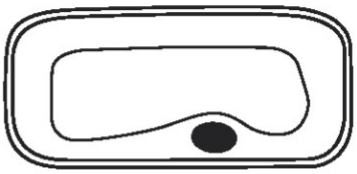
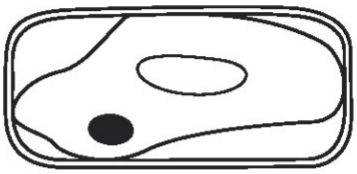
14)

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

A



B



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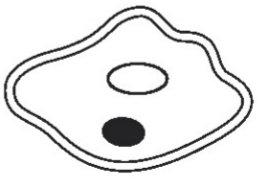
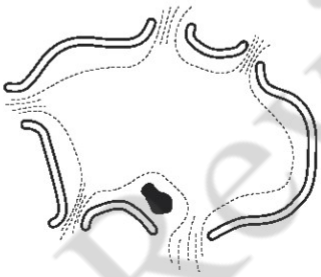


D



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15)

A frog's skin is permeable to oxygen and carbon dioxide.

When a frog is swimming in pond water, in which directions will oxygen and carbon dioxide diffuse?

	from the frog's skin into the water	from the water into the frog's skin
A	carbon dioxide	oxygen
B	carbon dioxide and oxygen	–
C	oxygen	carbon dioxide
D	–	carbon dioxide and oxygen

P.T.O 16)

Osmosis is defined as the diffusion of water molecules

A down their concentration gradient through a partially permeable membrane.

B down their concentration gradient through a permeable membrane.

C up their concentration gradient through a partially permeable membrane.

D up their concentration gradient through a permeable membrane.

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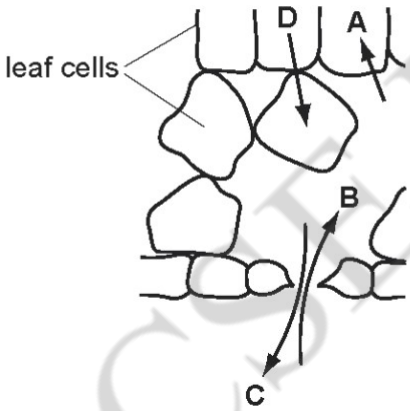
17)

The diagram shows part of a section through a leaf.

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



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18)

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

A active transport

B diffusion

C respiration

D transpiration

P.T.O 19)

The scent from a bunch of flowers spreads throughout a room.

How does the scent spread?

A by conduction

B by diffusion

C by osmosis

D by transpiration

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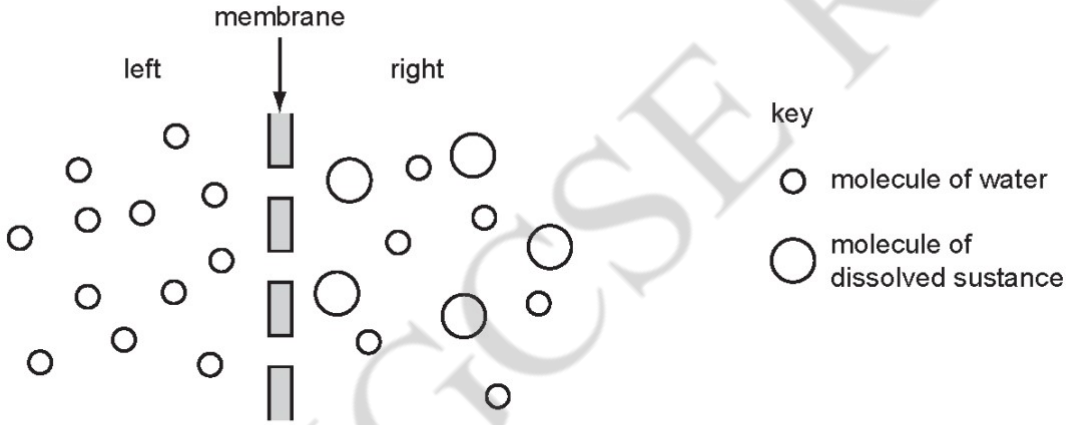
20)

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.

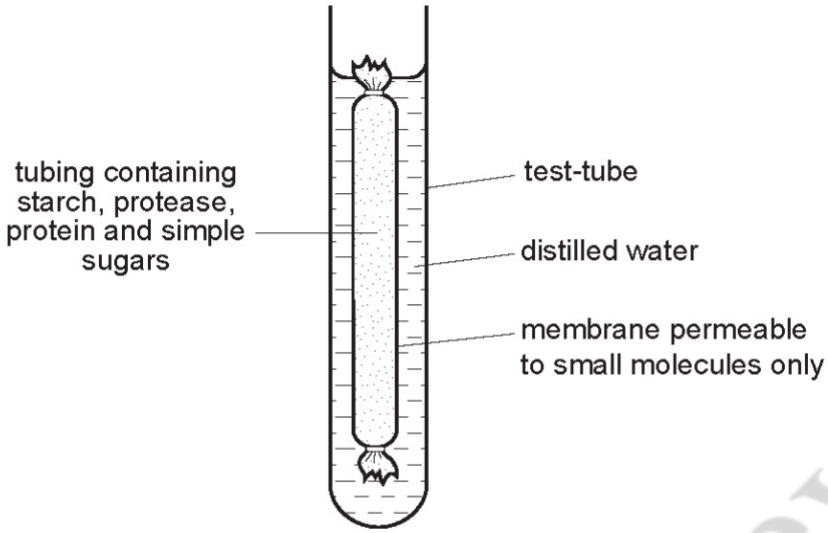
B Molecules of dissolved substance move from right to left.

C Overall, water molecules move from left to right.

D Overall, water molecules move from right to left.

P.T.O 21)

The diagram shows an experiment kept at room temperature.



What is present in the water surrounding the membrane after 45 minutes?

A amino acids and simple sugars

B protein and amino acids

C protein and simple sugars

D starch and simple sugars

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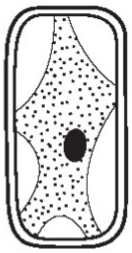
22)

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

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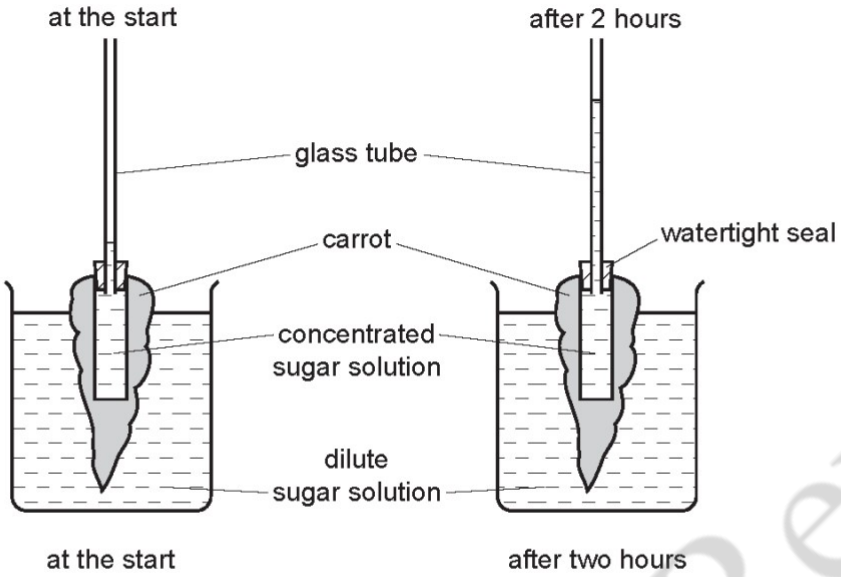
23)

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.

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24)

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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25)

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

26)

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	✗	✗	✓

27)

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

28)

Red blood cells were placed in a dilute solution.

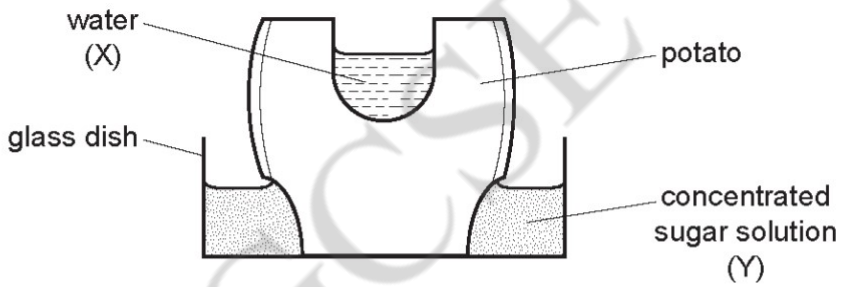
Movement of water across the cell membrane caused a change in their appearance.

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	✗	✓

29)

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

P.T.O 30)

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

31)

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.

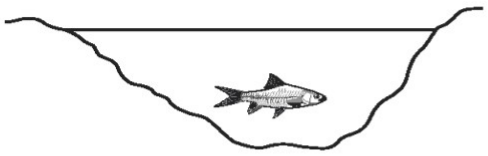
B Dissolved salts leave the cell by diffusion.

C Water enters the cell by osmosis.

D Water leaves the cell by osmosis.

32)

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.

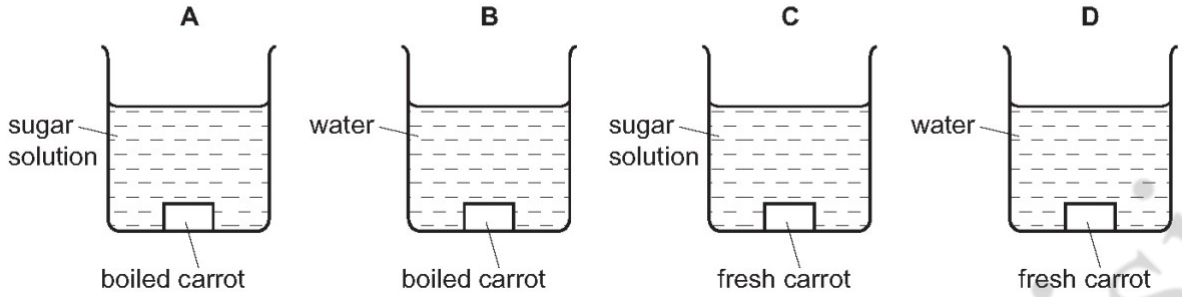
C Oxygen is needed by the fish for aerobic respiration.

D Oxygen is needed by the fish for anaerobic respiration.

33)

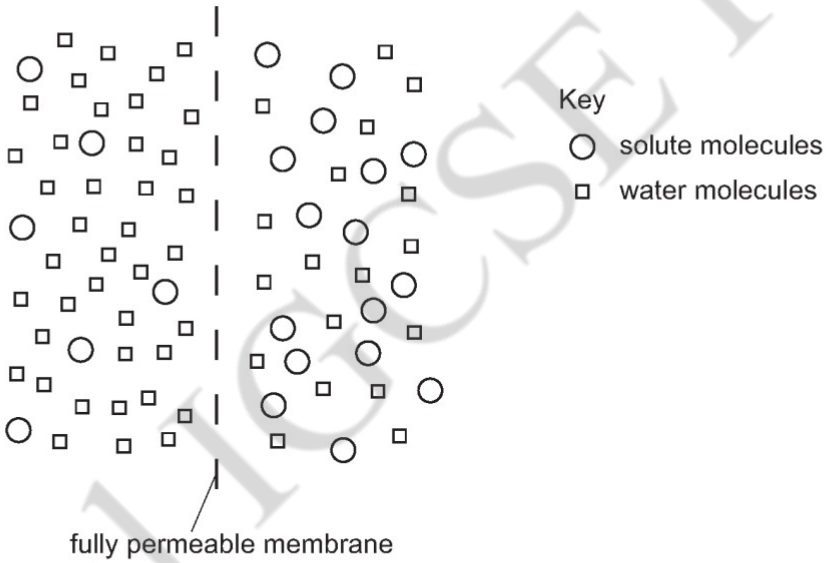
A student cuts out four pieces of carrot root of equal size. The pieces are treated as shown in the diagram, and then left for two hours.

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



34)

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

35)

Which structure provides the best surface for diffusion?

A atrium

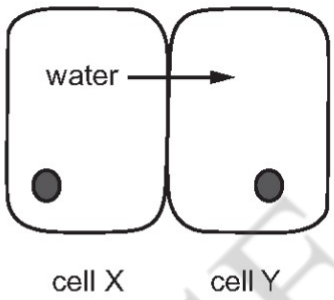
B bronchioles

C ileum

D trachea

36)

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

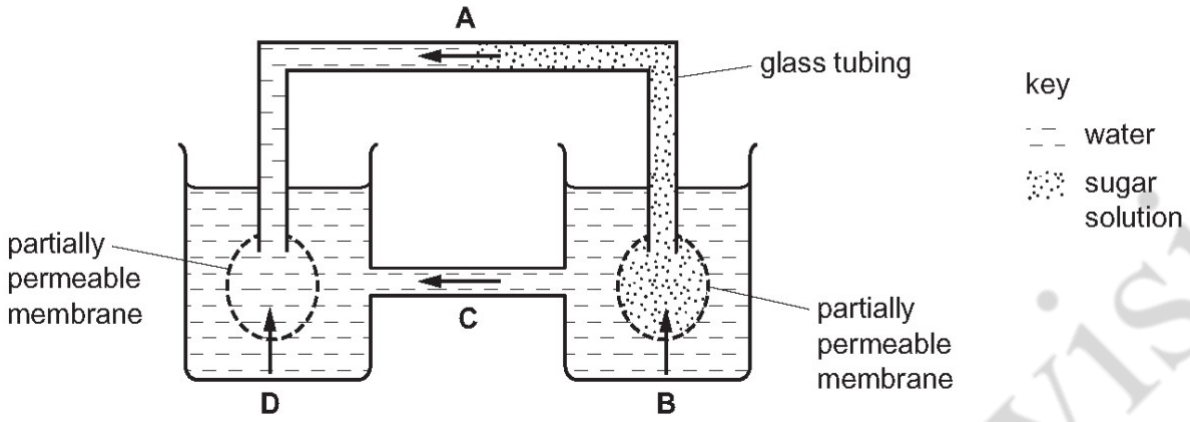
C water potential is lower in cell X and active transport occurs

D water potential is lower in cell X and osmosis occurs

P.T.O 37)

The diagram shows an experiment on osmosis.

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



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38)

For the stomata of a leaf to open, the guard cells accumulate more potassium ions than the surrounding cells.

Which row describes what happens?

	movement of potassium ions	movement of water in relation to guard cells	final state of the guard cells
A	active transport	in	turgid
B	active transport	out	flaccid
C	diffusion	in	plasmolysed
D	diffusion	out	no change

P.T.O 39)

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

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40)

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.

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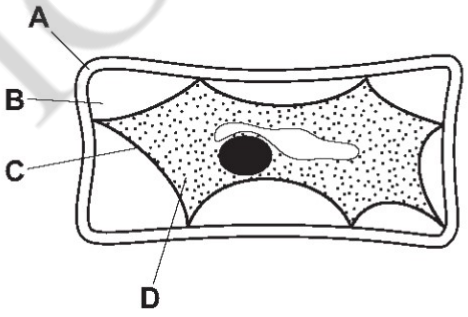
41)

The diagram shows a plant cell which has lost water to its surroundings by osmosis.

Which part is the partially permeable membrane?



P.T.O 42)

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

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43)

What describes active transport?

	energy required	particles move against concentration gradient
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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44)

Which is an example of active transport?

A carbon dioxide entering a leaf

B ion uptake by root hair cells

C oxygen moving from the alveoli into the blood

D water uptake by root hair cells

P.T.O 45)

Different factors affect the rate of diffusion of molecules across a membrane.

Which row represents changes to factors that will increase the rate of diffusion?

	concentration gradient across a membrane	thickness of membrane	surface area of membrane	temperature
A	decrease	decrease	increase	increase
B	decrease	increase	increase	decrease
C	increase	decrease	increase	increase
D	increase	increase	decrease	decrease

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46)

What would increase the rate of diffusion of oxygen into an animal cell?

A decreasing the concentration gradient between the inside of the cell and the outside

B decreasing the temperature of the cell and its surroundings

C increasing the distance that the oxygen molecules have to travel

D increasing the surface area of the cell membrane

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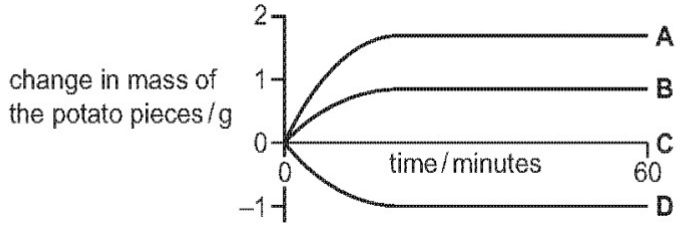
47)

Three equally sized pieces of potato were put into different concentrations of sucrose solution.
One piece of potato was put into distilled water.

The concentrations of sucrose solution were $0.2\,g\,dm^{-3}$, $0.4\,g\,dm^{-3}$ and $0.6\,g\,dm^{-3}$.

The graph shows the change in mass of the potato pieces over a period of 60 minutes.

Which piece of potato was put into distilled water?



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48)

A red blood cell and a palisade mesophyll cell are placed in a solution which has a higher water potential than the cells.

What will happen to each cell?

	red blood cell	palisade mesophyll cell
A	bursts	bursts
B	bursts	gains mass
C	loses mass	gains mass
D	loses mass	loses mass

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49)

Which words correctly complete the paragraph?

Diffusion may be defined as the net movement of particles from a region of their ……1…… concentration, to a region of their ……2…… concentration, where movement is ……3…… a concentration gradient.

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

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50)

The table shows the concentration of gases in a blood vessel and in an alveolus.

Which row shows the conditions that cause a gas produced in respiration to diffuse from the blood vessel into the alveolus?

	gas produced	concentration in the blood vessel	concentration in the alveolus
A	carbon dioxide	low	high
B	carbon dioxide	high	low
C	oxygen	low	high
D	oxygen	high	low

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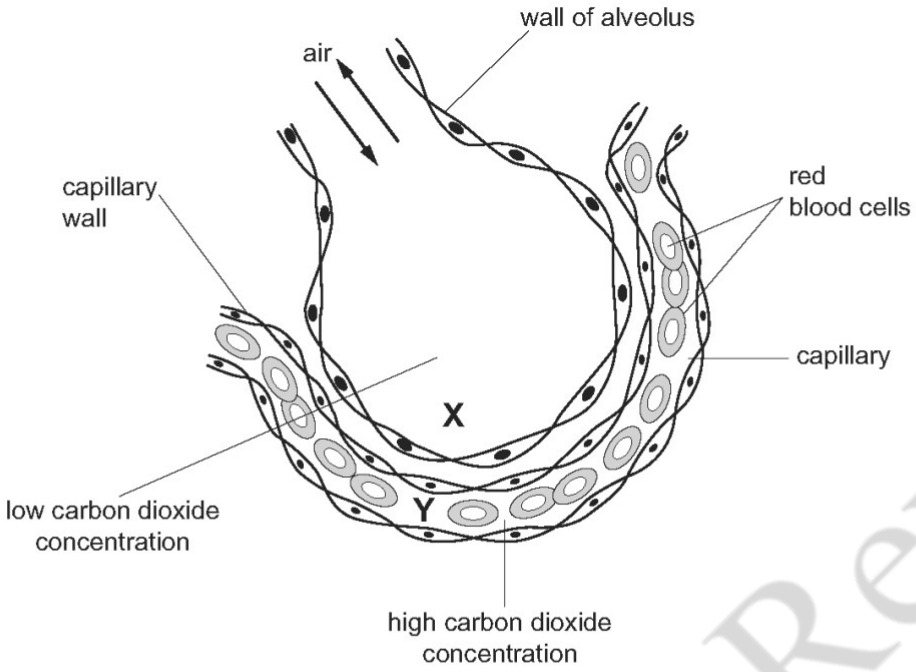
51)

The diagram shows a section through an alveolus and through a capillary.



How does carbon dioxide move from **Y** to **X**?

A by diffusion

B by osmosis

C by translocation

D by transpiration

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52)

Which part of a plant root hair is partially permeable?

A the cell sap

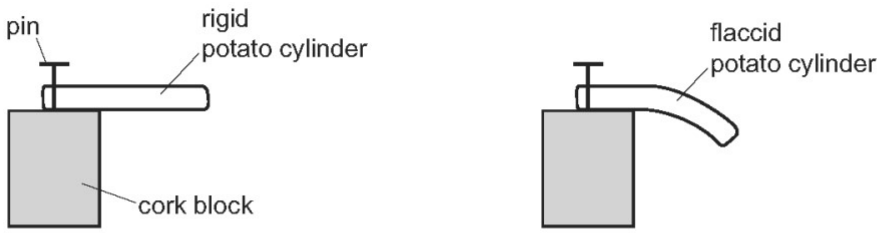
B the cell surface membrane

C the cell vacuole

D the cell wall

P.T.O 53)

Four freshly cut potato cylinders were soaked for one hour in different salt solutions before being pinned to cork blocks. Two of the blocks are shown.



Which solution would cause the potato cylinder to be most flaccid?

A 0.1 mol per dm^3 salt solution

B 0.3 mol per dm^3 salt solution

C 0.7 mol per dm^3 salt solution

D 1.0 mol per dm^3 salt solution

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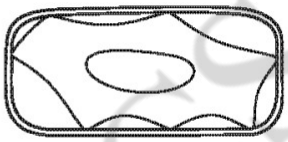
54)

The diagram shows a plant cell after it has been submerged in a solution, P, for 20 minutes.



Which row describes the water potential of solution P and the condition of the cell?

	water potential of solution P	condition of the cell
A	higher than the cell sap in the vacuole	plasmolysed and turgid
B	higher than the cell sap in the vacuole	under high turgor pressure
C	lower than the cell sap in the vacuole	plasmolysed and flaccid
D	the same as the cell sap in the vacuole	under low turgor pressure

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55)

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

A active transport

B diffusion

C osmosis

D transpiration

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56)

Which processes depend on the fact that water is a solvent?

	evaporation from the spongy mesophyll cells	glucose transported in blood plasma	movement of water by osmosis	loss of sweat from the skin surface
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✗	✗	✓
D	✗	✓	✓	✗

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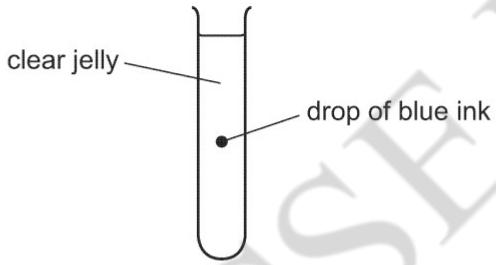
57)

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

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58)

Which process describes osmosis?

A diffusion of water through a cell wall

B diffusion of water through a partially permeable membrane

C diffusion of water through the cell sap

D diffusion of water through the cytoplasm

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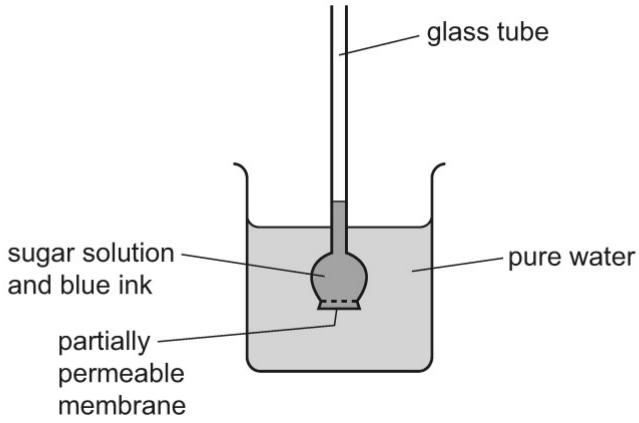
59)

The apparatus shown was set up.



Some hours later, the water in the beaker had turned blue, and the liquid in the glass tube had moved upwards.

Which processes caused these changes?

	water turned blue	liquid in glass tube moved upwards
A	osmosis	diffusion
B	active transport	osmosis
C	diffusion	active transport
D	diffusion	osmosis

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60)

Red blood cells were placed in pure water.

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

What caused this change in appearance?

	direction of water movement	from higher to lower water potential	from lower to higher water potential
A	into cells	yes	no
B	into cells	no	yes
C	out of cells	yes	no
D	out of cells	no	yes

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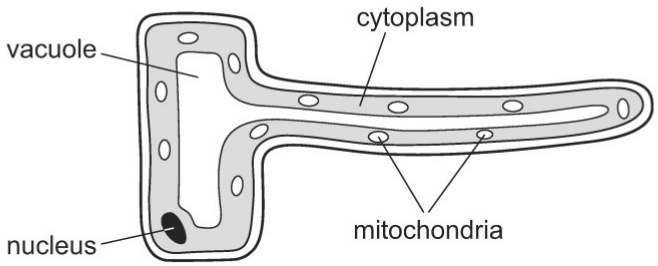
61)

The diagram shows a root hair cell.



Why does a root hair cell contain a large number of mitochondria?

A to provide energy for the absorption of water from the soil

B to provide energy for the diffusion of mineral ions from the soil

C to provide energy for osmosis

D to provide energy for the active transport of mineral ions from the soil

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62)

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 must oxygen be present?

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

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63)

Some pieces of potato were placed in a very concentrated sugar solution. Other pieces of potato were placed in distilled water.

What happened to the mass of the potato pieces in the two liquids?

	mass of the potato pieces in a very concentrated sugar solution	mass of the potato pieces in distilled water
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

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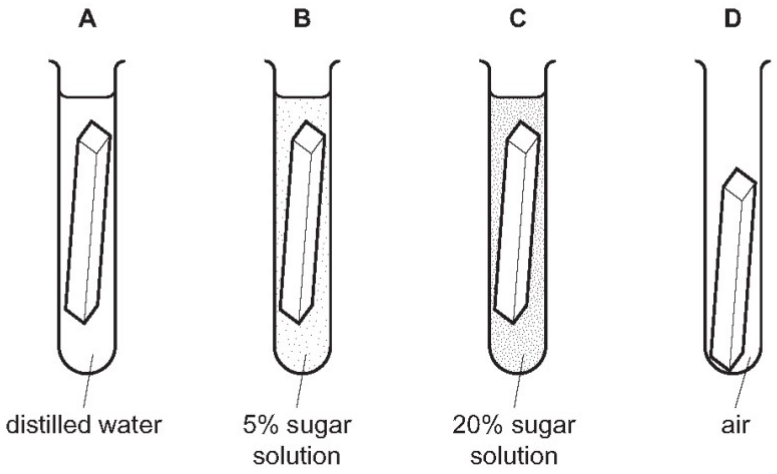
64)

The diagram shows four identical pieces of potato in test-tubes. The potato pieces were left as shown for six hours.

Which piece of potato would have the greatest increase in mass?



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65)

The diagram shows apparatus used to investigate osmosis.

The volumes of solutions A, B, C and D were the same at the start of the investigation.

After one hour, the solutions had moved up the glass tubes.

Which solution was the most concentrated at the start of the investigation?