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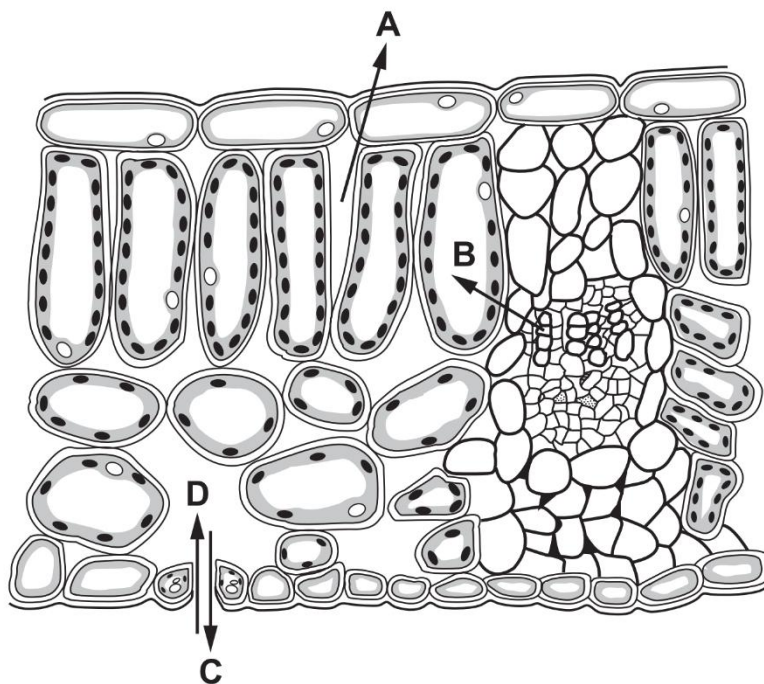
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Revision of Secondary Two Biology – Transport Systems in Plants and Animals

1. The diagram shows a section through a leaf.

Which arrow shows the direction of diffusion of carbon dioxide on a sunny day?

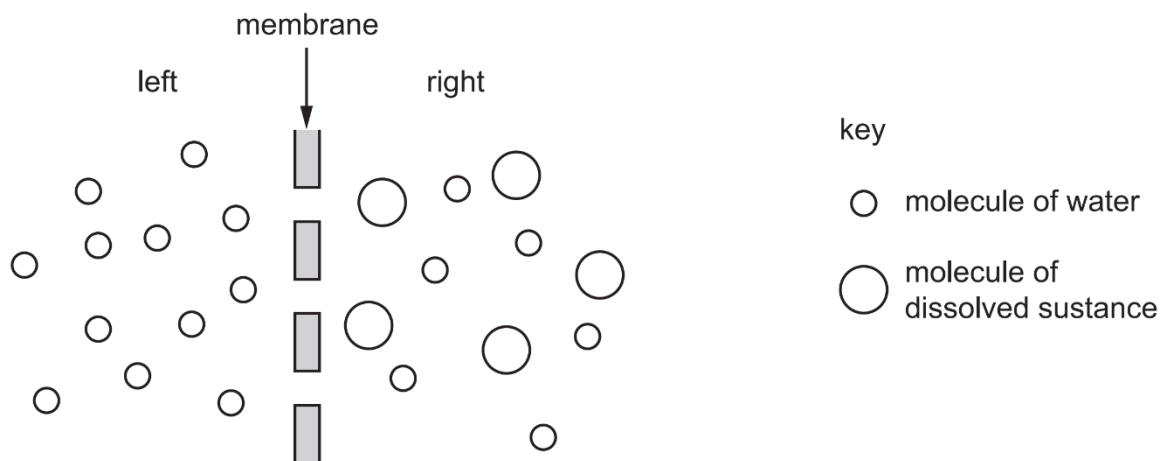


2. Protoplasts are plant cells that have had their cell walls removed.

What happens if plant protoplasts are placed in distilled water?

- A They get larger and become turgid.
 - B They get larger and burst.
 - C They get smaller and become plasmolysed.
 - D They get smaller and shrivel up.
3. Which blood vessel, if it becomes blocked, could lead **directly** to a heart attack?
- A Coronary artery
 - B Pulmonary artery
 - C Pulmonary vein
 - D Vena cava

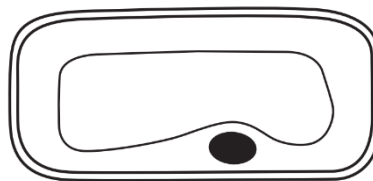
4. The diagram represents two liquids, separated by a membrane through which osmosis can occur.



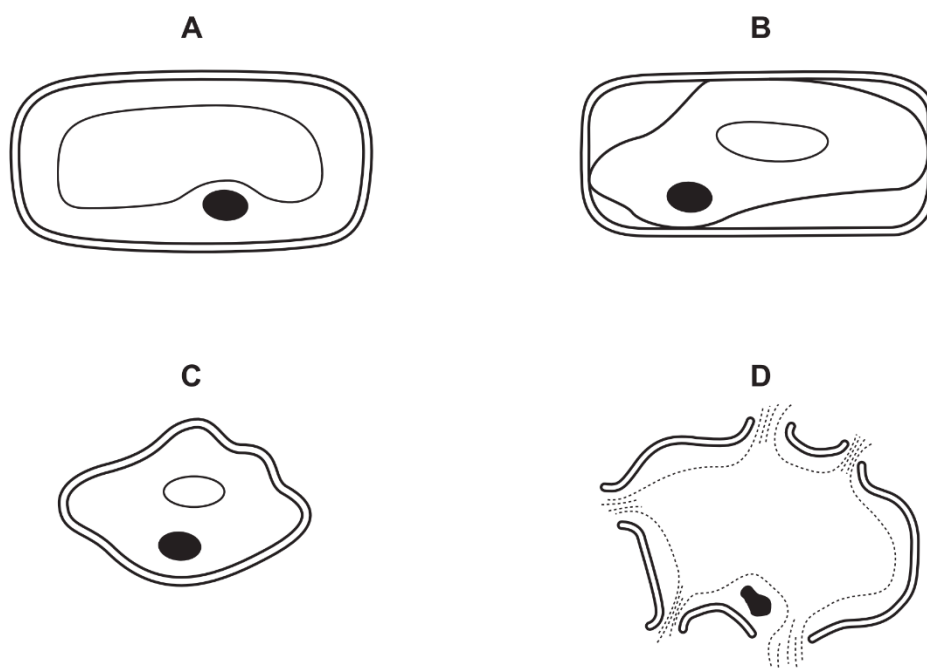
Which statement describes how the molecules will move?

- 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.

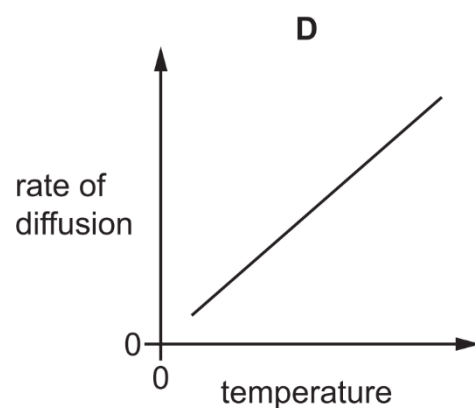
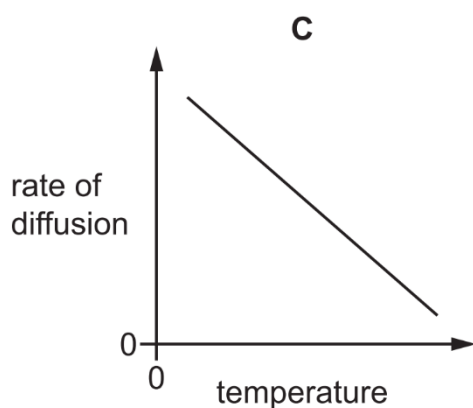
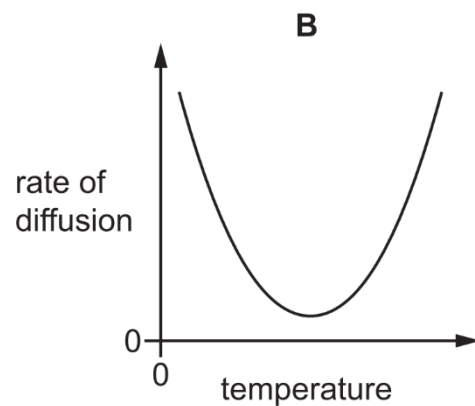
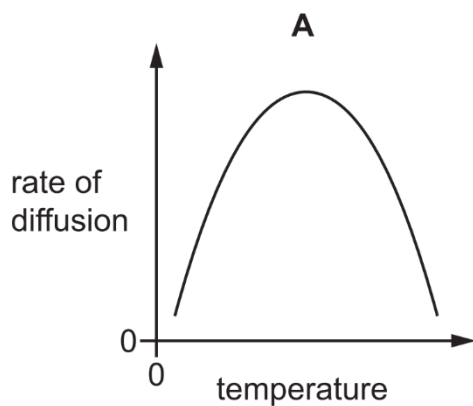
5. The diagram shows a plant cell.



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



6. Which graph represents the effect of increasing temperature on the rate of diffusion?



7. A hospital patient who is feeling unwell is given a blood test. The results of the blood test show a very low level of platelets. What effect will this have?
- A** The blood will be unable to transport nutrients, hormones and carbon dioxide.
 - B** The blood will not be able to carry as much oxygen to the tissues as normal.
 - C** There will be a greater risk of bleeding because the blood will take longer to clot.
 - D** There will be a greater risk of infection because the blood cannot make antibodies.
8. What is an advantage of a double circulatory system in mammals?
- A** Blood can flow down the body on the left and up the body on the right.
 - B** Blood can flow more slowly along the circulatory system.
 - C** Blood pressure stays the same throughout the circulatory system.
 - D** Oxygenated and deoxygenated blood are kept separate.

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

When a frog is swimming in pond water, in which directions will there be a net diffusion of oxygen and carbon dioxide?

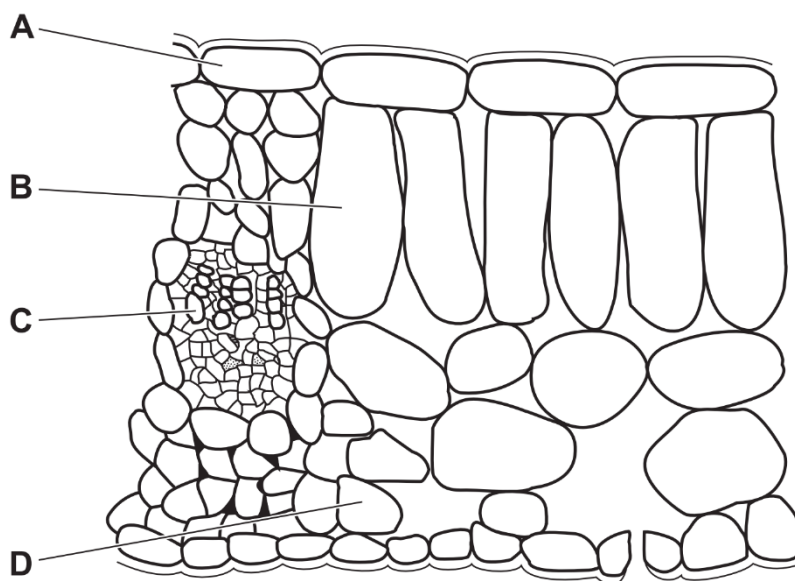
	from the frog into the water	from the water into the frog
A	carbon dioxide	oxygen
B	carbon dioxide and oxygen	no movement
C	oxygen	carbon dioxide
D	no movement	carbon dioxide and oxygen

- 10.** Which process only involves the movement of water through the selectively permeable membrane of a cell?

- A** Absorption **B** Evaporation
C Osmosis **D** Transpiration

- 11.** A leafy shoot is placed in a solution of a red dye.

After 30 minutes, which part of a leaf from this shoot will contain the red dye?

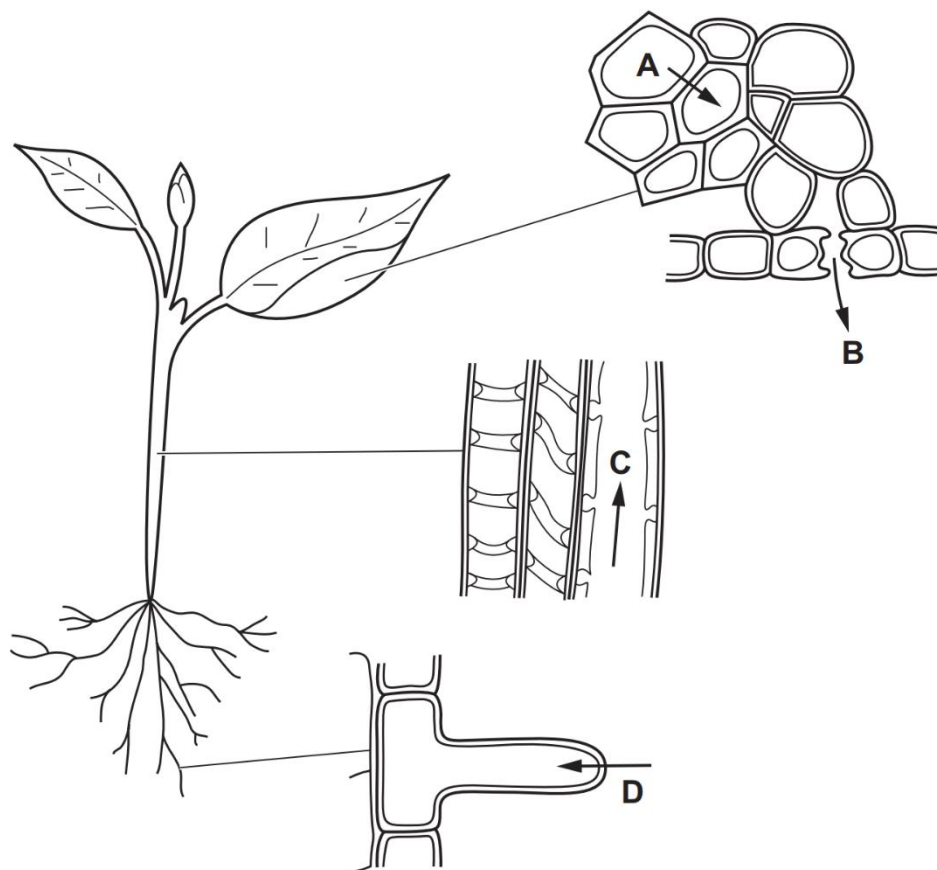


- 12.** What is the function of a root hair cell?

- A** Absorption
B Photosynthesis
C Reproduction
D Support

13. The diagrams show stages in the passage of water through a plant.

Which arrow shows water moving in the form of water vapour?



14. Which row describes osmosis?

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

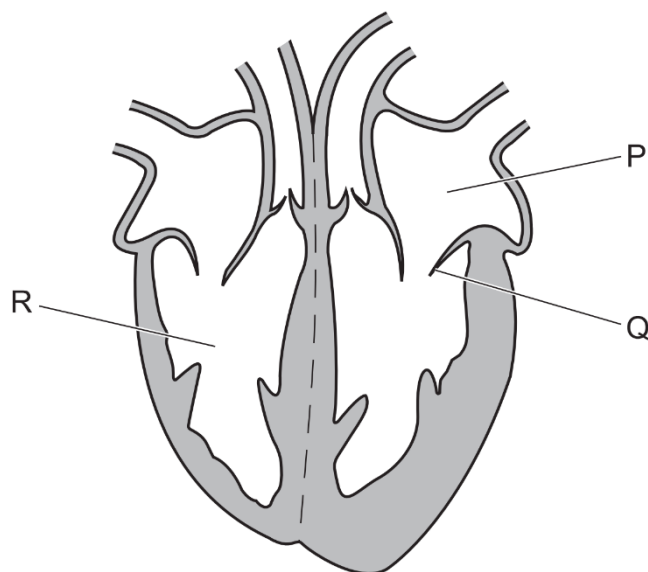
Key:
 ✓ = yes
 ✗ = no

15. When stems with white flowers are cut and placed in a blue stain the petals turn blue.

Which tissue in the stem does the stain travel through to reach the petals?

A Epidermis **B** Mesophyll **C** Phloem **D** Xylem

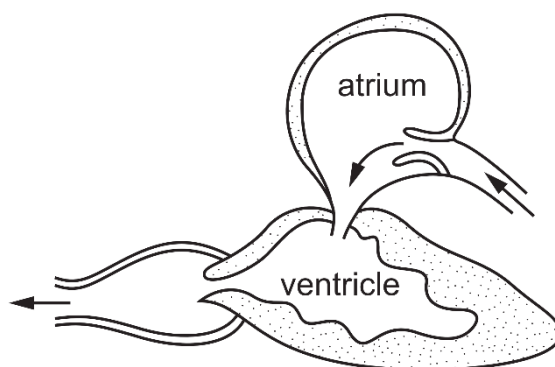
16. The diagram shows a section of the heart.



What is the function of the structure labelled **Q**?

- A** It controls the amount of blood leaving the heart.
- B** It increases the pressure in part **R**.
- C** It prevents backflow of blood into part **P**.
- D** It prevents blood flowing into the vena cava.

17. The diagram shows a section through a fish heart and the direction of blood flow.



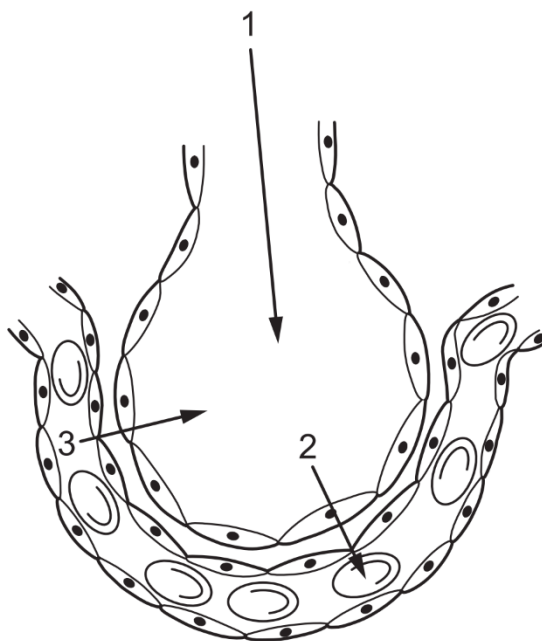
After leaving the heart, where will the blood flow to next?

- A** Eyes
- B** Fins
- C** Gills
- D** Tail muscle

18. Which process releases water vapour into the atmosphere from the leaves of trees?

- A** Active transport
- B** Osmosis
- C** Respiration
- D** Transpiration

19. The diagram shows an alveolus. The arrows represent the movement of gases.



Which row is correct?

	1	2	3
A	oxygen	carbon dioxide	air
B	air	carbon dioxide	oxygen
C	air	oxygen	carbon dioxide
D	carbon dioxide	oxygen	air

20. Mammals have a double circulation.

Which shows the correct sequence for the movement of blood in a mammal?

- A** body → heart → lungs → heart
- B** body → lungs → body → heart
- C** heart → lungs → body → heart
- D** heart → body → lungs → heart

21. Which process can **only** occur through a membrane?

	active transport	diffusion	osmosis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

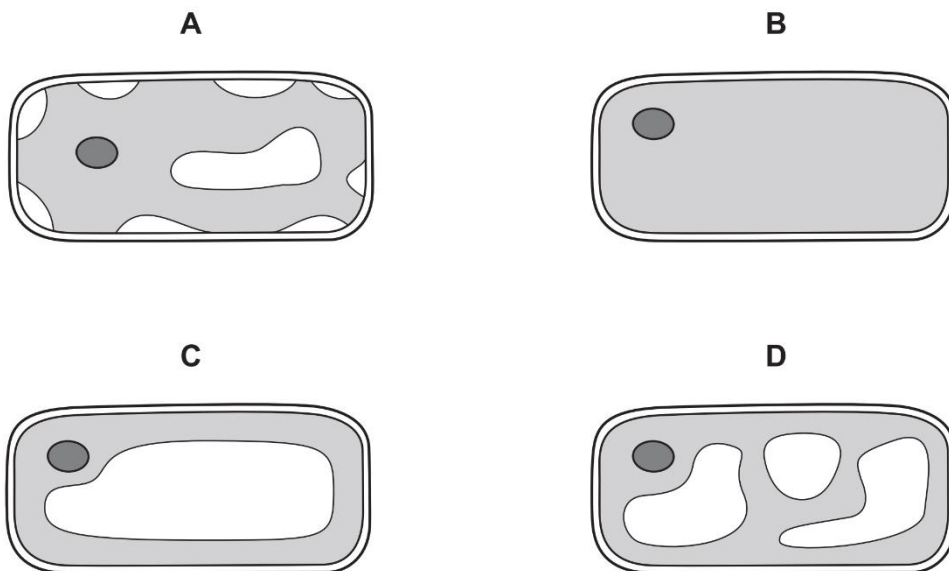
22. The diagram shows a section through a blood vessel.



Which type of blood vessel is shown, and in which direction does the blood flow?

	type of vessel	direction of flow
A	artery	P to Q
B	artery	Q to P
C	vein	P to Q
D	vein	Q to P

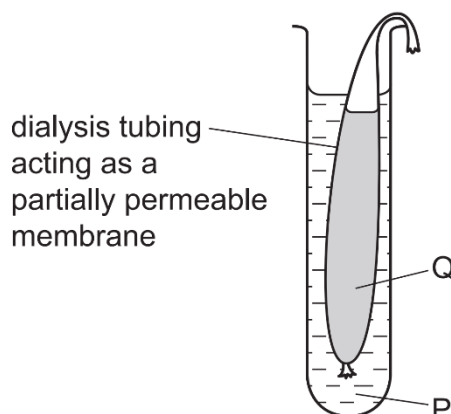
23. Which diagram shows the appearance of a plant cell several minutes after it has been placed in a concentrated solution of sugar?



24. What is the correct route for blood flow in a human?

- A** left atrium → left ventricle → lungs → right ventricle → right atrium
- B** left atrium → left ventricle → right ventricle → right atrium → lungs
- C** right atrium → right ventricle → left ventricle → left atrium → lungs
- D** right atrium → right ventricle → lungs → left atrium → left ventricle

25. 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

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

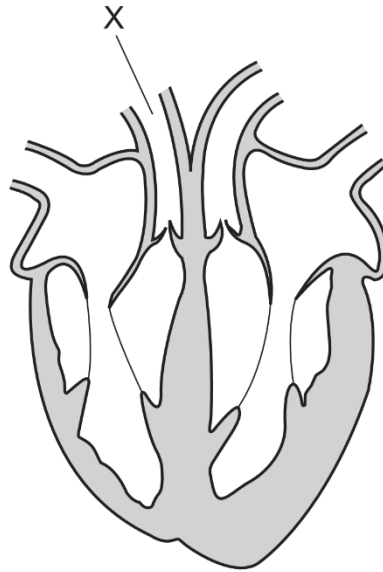
Which liquid will cause a decrease in the size of the piece of potato?

- 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 content.

27. Which row in the table describes the features of the pulmonary vein?

	feature of pulmonary vein		
	blood	lumen	muscle layer
A	deoxygenated	narrow	thin
B	deoxygenated	wide	thick
C	oxygenated	narrow	thick
D	oxygenated	wide	thin

28. The diagram shows a section through the heart and its blood vessels.



Which row gives the vessel name and the direction of blood flow in vessel **X**?

	vessel name	direction of blood flow
A	aorta	towards the lungs
B	pulmonary artery	towards the lungs
C	pulmonary artery	away from the lungs
D	vena cava	away from the lungs

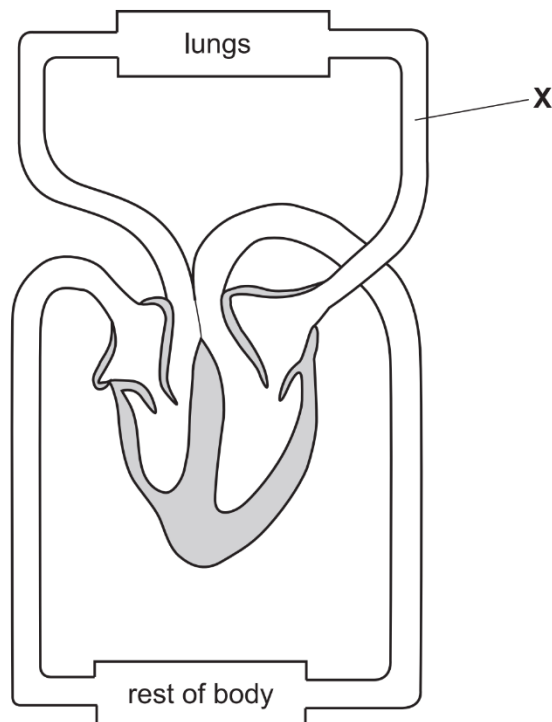
29. Plant cells are placed in a solution with a higher water potential than the plant cell contents.
What will happen?

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

30. Compared to a vein, an artery has

- A** A thinner wall.
- B** A wall with more elastic tissue.
- C** A wider lumen.
- D** Valves.

31. The diagram shows the human heart and main blood vessels.



What is the blood vessel labelled **X**?

- A** Aorta
- B** Pulmonary artery
- C** Pulmonary vein
- D** Vena cava

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

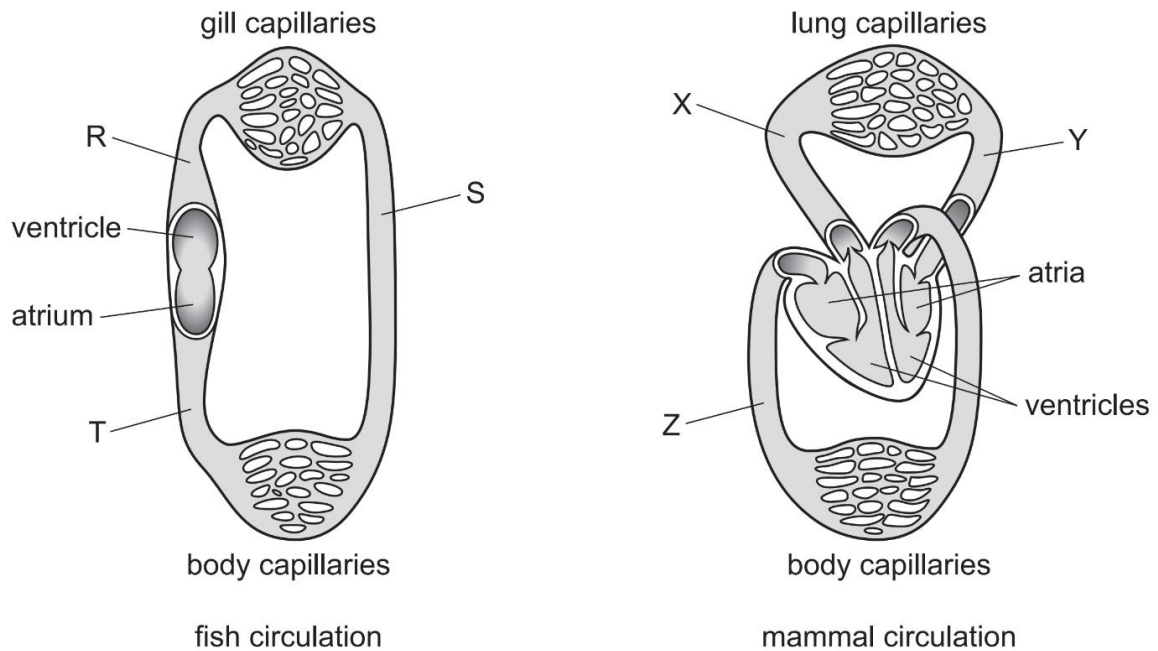
Which row explains why this has happened and how the potato cells have changed?

	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

33. Which statement is always correct when oxygen is diffusing out of a plant cell?

- A** The concentration of carbon dioxide is higher inside the cell than outside.
- B** The concentration of carbon dioxide is higher outside the cell than inside.
- C** The concentration of oxygen is higher inside the cell than outside.
- D** The concentration of oxygen is higher outside the cell than inside.

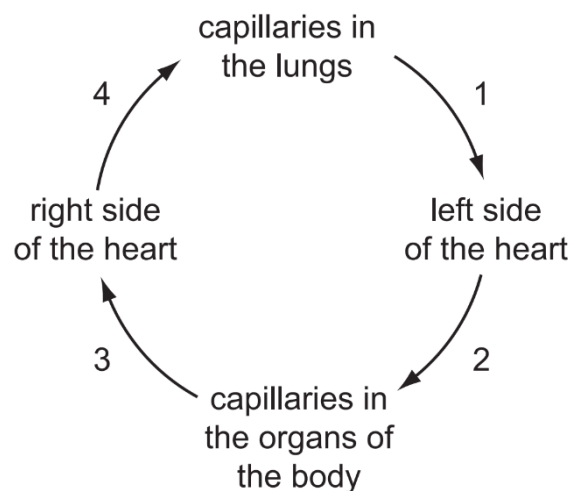
34. The diagrams show the single circulation of a fish and the double circulation of a mammal.



Which letters represent areas of oxygenated blood?

- A** R and X **B** S and Y **C** T and Y **D** T and Z

35. The diagram shows the direction of blood flow in the human body.



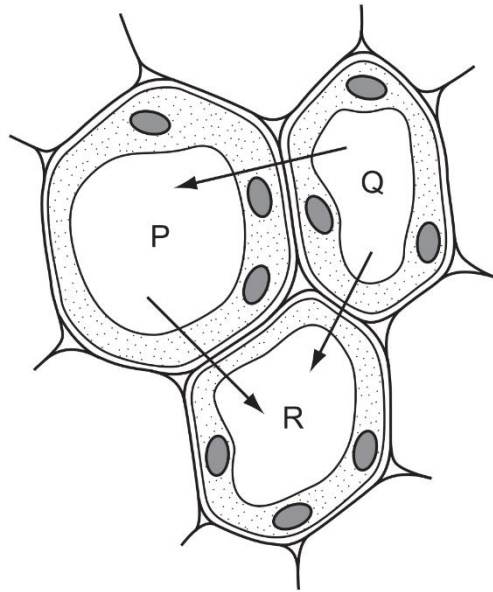
Which numbered stages have blood containing the **most** oxygen?

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

36. What describes the upper cuticle of a leaf?

- A** A single layer of cells containing many chloroplasts.
B A single layer of transparent cells allowing light to enter the leaf.
C A thin non-cellular layer preventing water loss from the leaf.
D A permeable layer allowing water to enter the leaf.

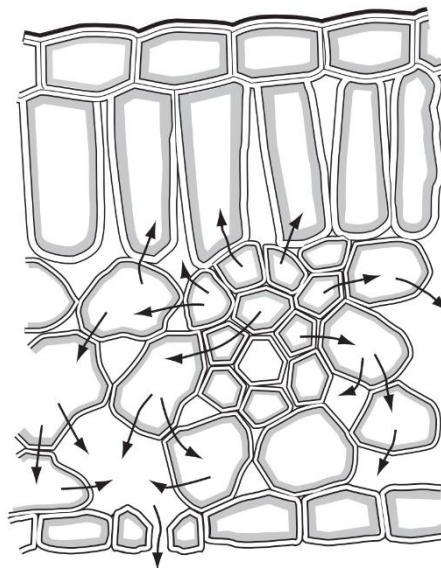
37. The diagram shows part of a leaf with three spongy mesophyll cells labelled **P**, **Q** and **R**. The arrows show the direction of water movement by osmosis.



Which is the correct order of water potential in the cells from the highest to the lowest?

	highest	middle	lowest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	R	P	Q

38. The diagram shows a section through a green leaf.

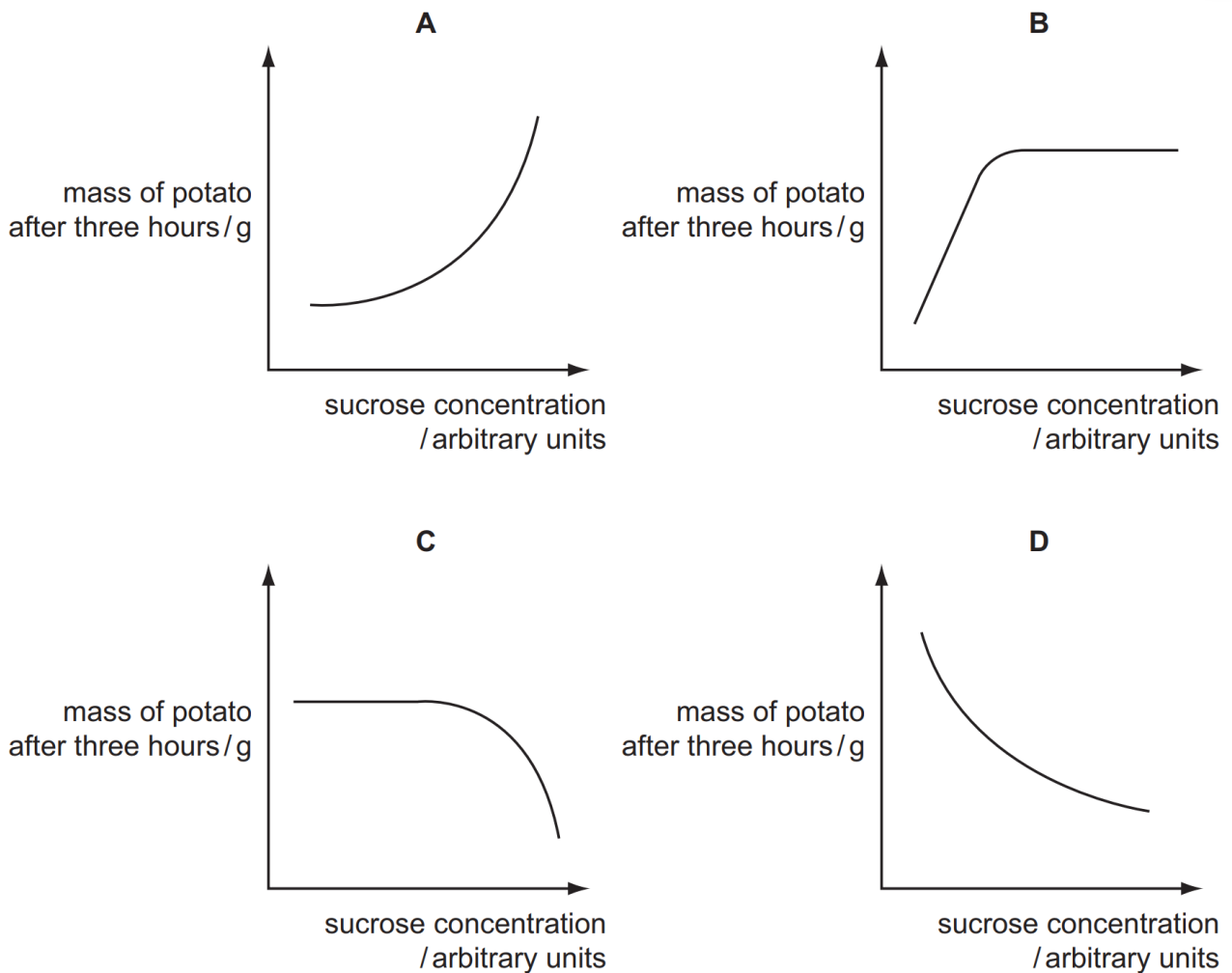


What do the arrows represent the movement of?

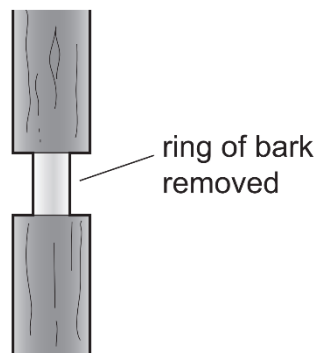
- A** Carbon dioxide during photosynthesis. **B** Oxygen during photosynthesis.
C Sugars during translocation. **D** Water during transpiration.

39. Identical pieces of potato are placed in sucrose solutions of different concentrations. After three hours, the mass of each potato piece is measured.

Which graph shows the results of this experiment?



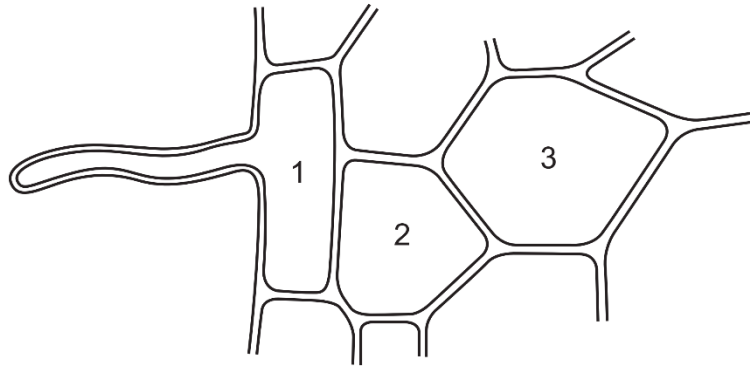
40. The diagram shows a tree trunk, with a ring of bark, which includes the phloem, removed.



The tree will eventually die because this action cuts off the supply of...

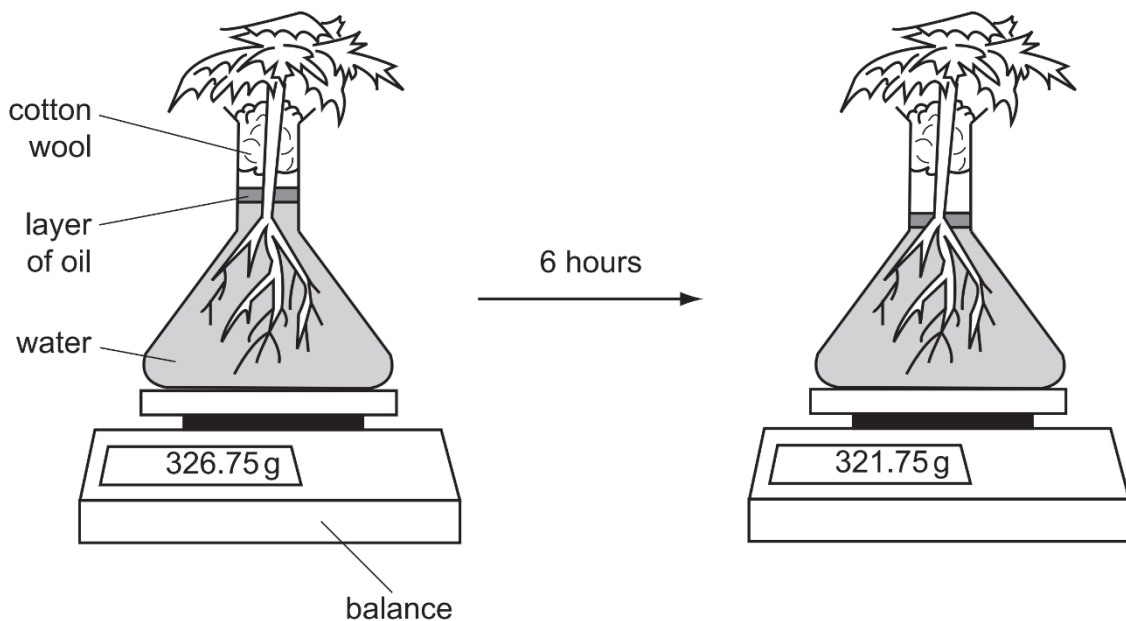
- A Mineral salts to the leaves.
- B Organic nutrients to the roots.
- C Oxygen to the roots.
- D Water to the leaves.

41. The diagram shows some cells in the root of a plant that is absorbing water from the soil.



How does the water potential of the cell marked 2 differ from the water potentials of the cells marked 1 and 3?

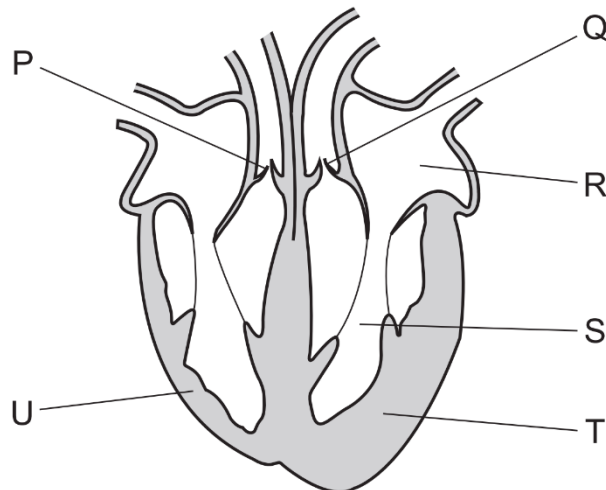
- A Higher than cell 1 and cell 3
 - B Higher than cell 1 and lower than cell 3
 - C Lower than cell 1 and higher than cell 3
 - D Lower than cell 1 and lower than cell 3
42. The diagrams show a plant in a flask of water. It is left in the light at 16 °C for six hours.



What explains the change in mass after six hours?

- A Absorption of water into the root hairs.
- B Evaporation of water from the flask.
- C Photosynthesis in the leaves of the plant.
- D Transpiration from the leaves of the plant.

43. The diagram shows a section through the human heart.

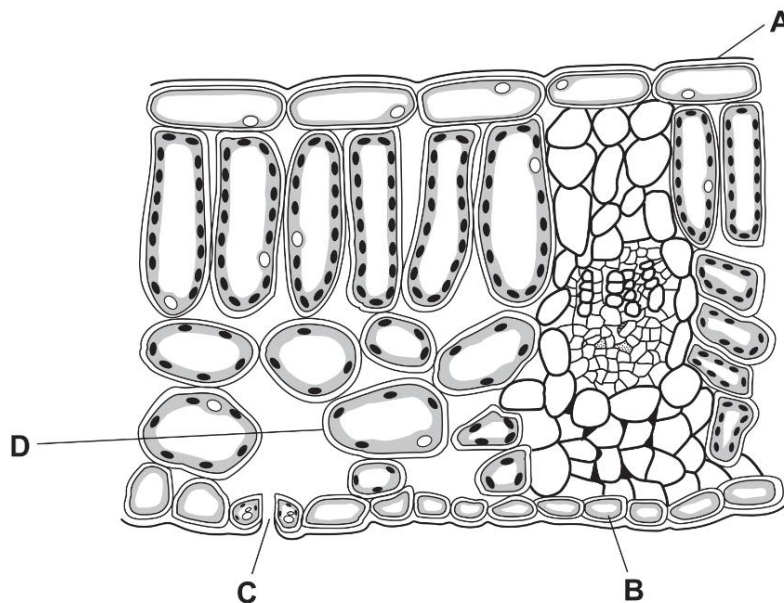


Which labelled features suggest that blood leaves the heart at different pressures, when going to the lungs and to the body?

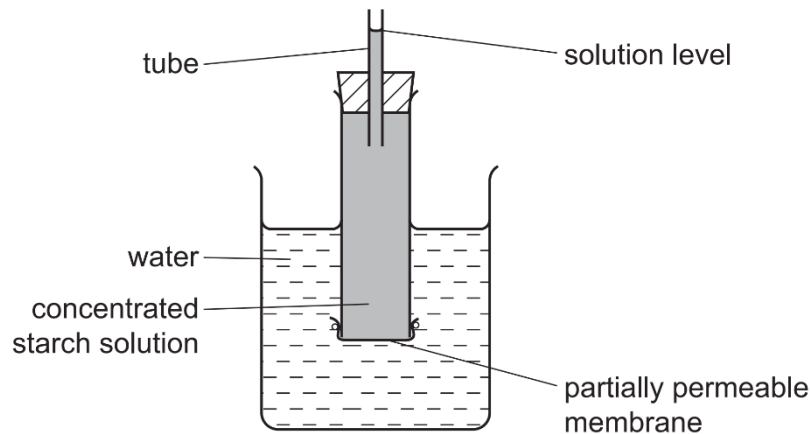
- A Chambers **R** and **S** have different volumes.
- B The walls of the atria are thinner than the walls of the ventricles.
- C Valve **P** is stronger than valve **Q**.
- D Wall **T** is more muscular than wall **U**.

44. The diagram shows a cross-section of a leaf.

From which part does most of the water evaporate during transpiration?



45. The diagram represents apparatus used to investigate osmosis.



Which molecules will move across the partially (selectively) permeable membrane and which change will occur in the solution level?

	molecules	solution level
A	starch	fall
B	starch	rise
C	water	fall
D	water	rise

46. Four similar leafy shoots are exposed to different conditions. The rates of water uptake and the rates of water loss are measured.

The results are shown in the table.

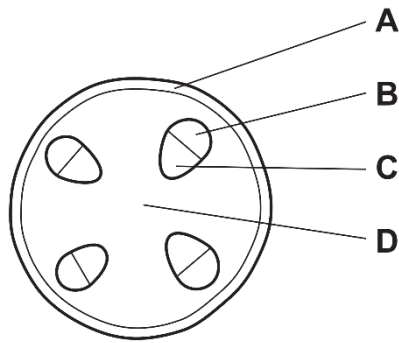
Which shoot is most likely to wilt?

	water uptake / mm ³ per minute	water loss / mm ³ per minute
A	14	13
B	10	12
C	5	5
D	4	2

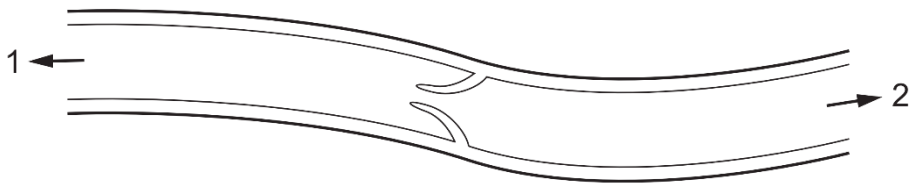
47. Which row describes the functions of the blood components?

	plasma	platelets	white blood cells
A	antibody formation	clotting	transport of nutrients
B	clotting	transport of nutrients	antibody formation
C	clotting	antibody formation	transport of nutrients
D	transport of nutrients	clotting	antibody formation

48. The diagram shows a section through the stem of a dicotyledonous plant.
Which tissue transports sugars through the stem?



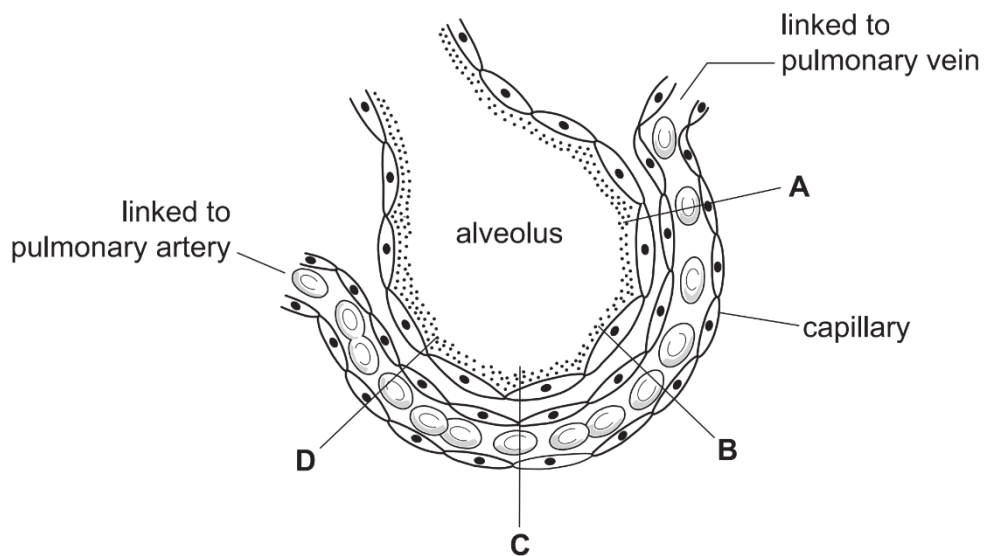
49. The diagram shows a section through part of a vein.



What could be the first organs found in the directions 1 and 2?

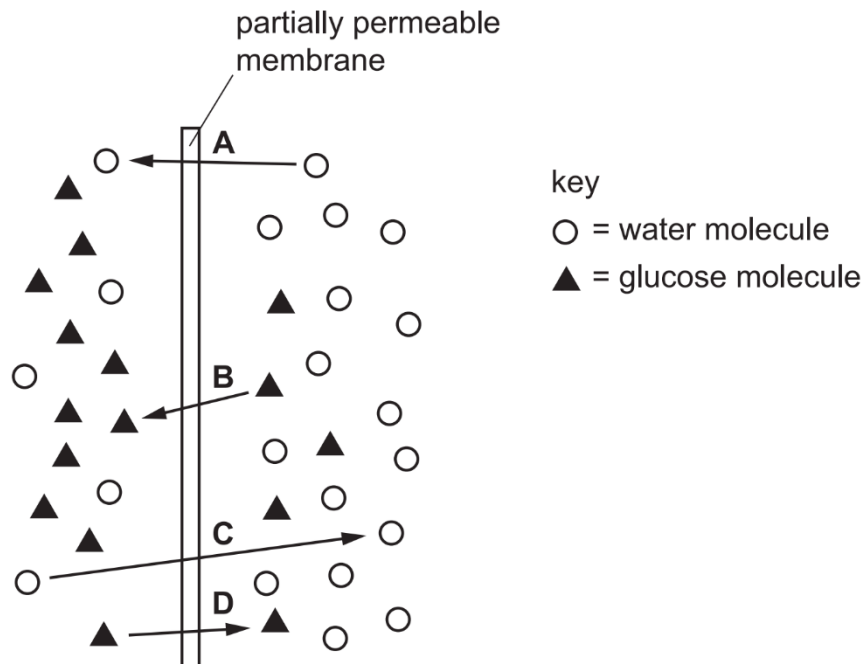
	1	2
A	heart	brain
B	intestine	liver
C	kidney	heart
D	lung	heart

50. The diagram shows an alveolus and an associated blood capillary.
At which point will the greatest rate of diffusion of carbon dioxide occur?



51. The diagram represents the passage of water molecules and glucose molecules across a partially permeable cell surface membrane.

Which arrow indicates osmosis?



52. A cube of fresh potato is weighed. It is then placed in a test-tube containing a dilute solution of sucrose. After an hour, its mass has increased.

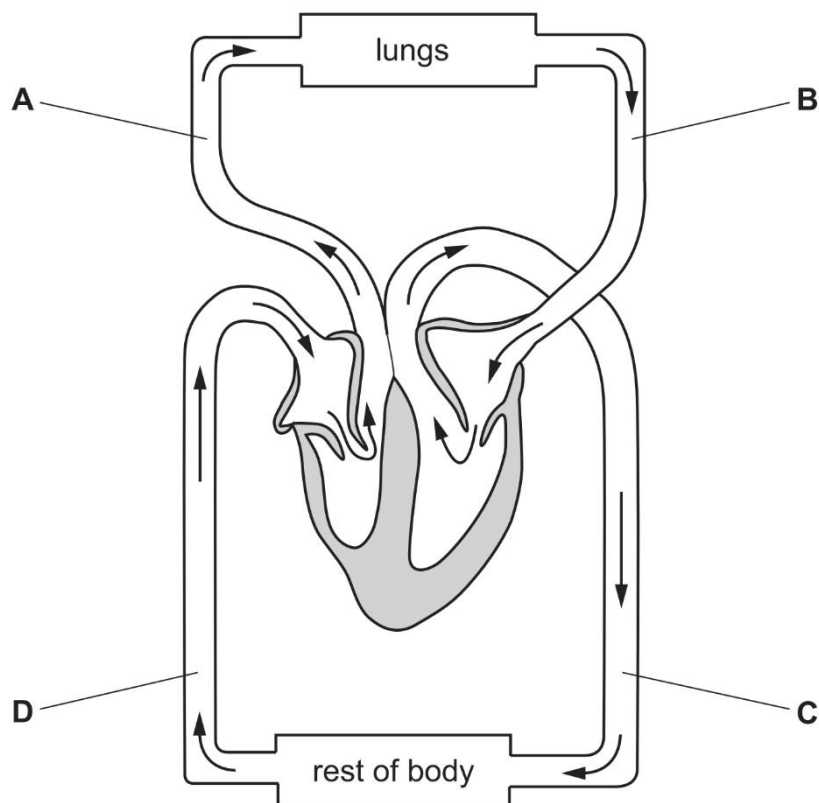
Which process has occurred and what has happened to the concentration of the sucrose in the solution in the test-tube?

	process	sucrose concentration
A	active transport	decreased
B	active transport	increased
C	osmosis	decreased
D	osmosis	increased

53. Which statement describes transpiration?

- A** Evaporation of water from mesophyll cells and its loss through the stomata.
- B** Gaseous exchange between the leaves and the atmosphere.
- C** Movement of water by osmosis from the roots to the leaves.
- D** Movement of water up through the xylem and into the mesophyll cells.

- 54.** The diagram shows the circulatory system.
In which vessel is the blood pressure highest?



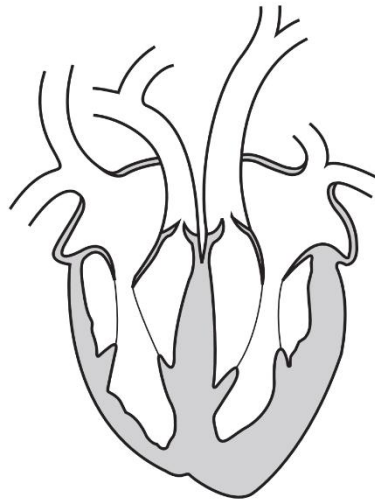
- 55.** Active transport, diffusion and osmosis are described below.
- 1 The movement of ions or molecules across the cell membrane against a concentration gradient using energy.
 - 2 The movement of ions or molecules from a region of high concentration to a region of low concentration down a concentration gradient.
 - 3 The movement of water molecules from a region of their higher concentration to a region of their lower concentration through a partially permeable membrane.

What links the descriptions with their names?

	diffusion	osmosis	active transport
A	1	3	2
B	2	1	3
C	2	3	1
D	3	2	1

56. Scientists believe that absorption of mineral ions in plants requires energy from respiration. Which observation best supports this idea?
- A Carbohydrate is stored in the roots.
 - B Living roots give off carbon dioxide.
 - C The root hairs have a large surface area.
 - D Uptake of mineral ions is reduced in lower oxygen concentrations.

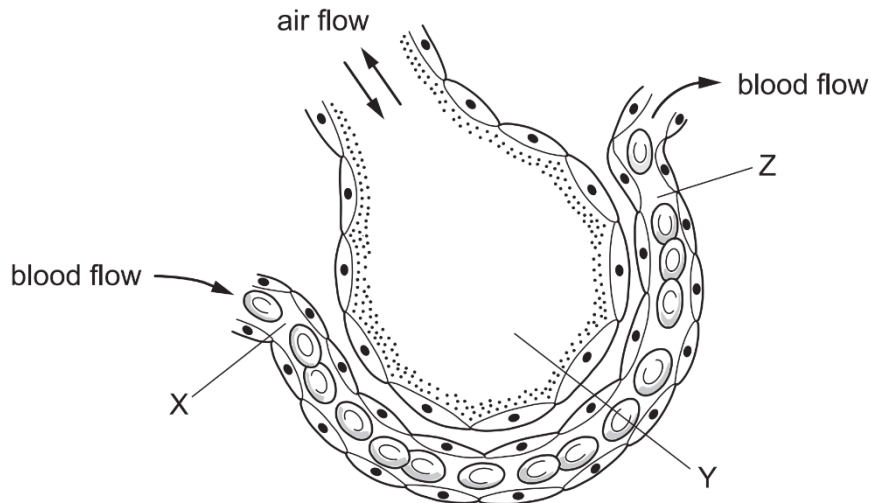
57. The diagram shows a section through the human heart.



Why is the wall of the right ventricle thicker than the wall of the right atrium?

- A The chambers have different oxygen concentrations.
 - B The right atrium must pump blood all the way around the body.
 - C The right ventricle must exert a greater force than the right atrium.
 - D The right ventricle receives more blood than the right atrium.
58. Under which set of conditions will the transpiration rate of a well-watered plant be fastest?
- A A cool, dry, windless day.
 - B A cool, rainy, windy day.
 - C A hot, dry, windy day.
 - D A hot, rainy, windy day.
59. Which statements about arteries are correct?
- 1 All arteries carry oxygenated blood.
 - 2 Arteries carry blood at high pressure.
 - 3 All arteries carry blood away from the heart.
- A 1 and 2 only B 1 and 3 only C 2 and 3 only D 1, 2 and 3

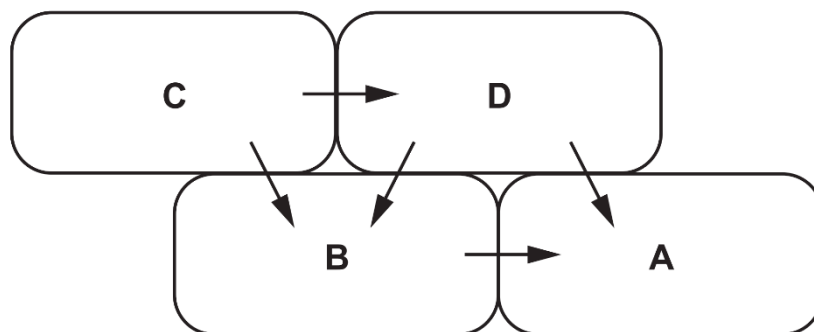
60. The diagram shows a section of an alveolus and a capillary in a lung.



What are the relative concentrations of carbon dioxide at X, Y and Z?

	X	Y	Z
A	high	high	high
B	high	low	low
C	low	high	high
D	low	high	low

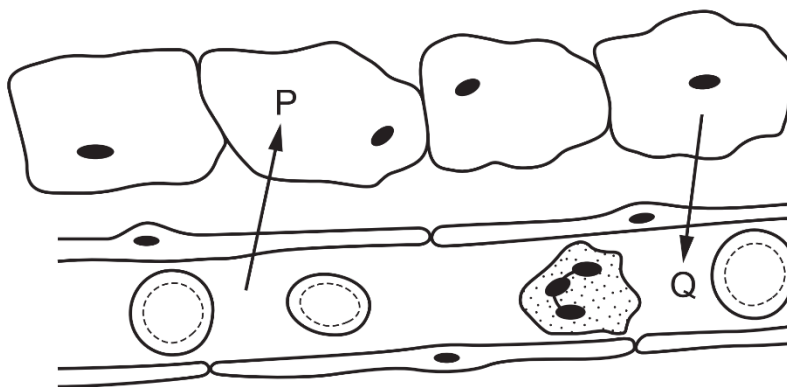
61. The diagram shows the net movement of water by osmosis between four adjacent cells. Which cell has the highest water potential?



62. What describes the diffusion of molecules?

- A Movement from a region of their higher concentration to a region of their lower concentration down a concentration gradient.
- B Movement from a region of their higher concentration to a region of their lower concentration up a concentration gradient.
- C Movement from a region of their lower concentration to a region of their higher concentration down a concentration gradient.
- D Movement from a region of their lower concentration to a region of their higher concentration up a concentration gradient.

63. The diagram shows chemicals being exchanged between some cells and a blood capillary.



What could be the identities of chemicals **P** and **Q**?

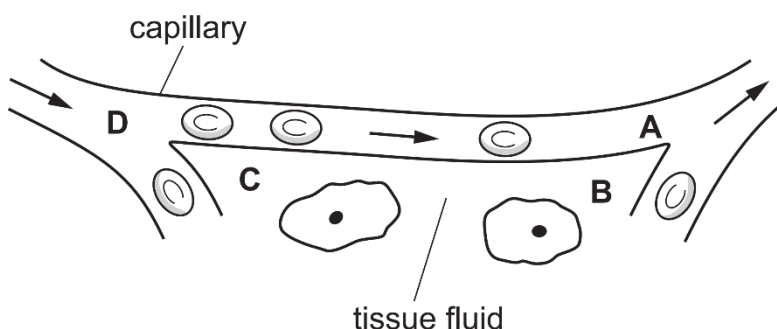
	P	Q
A	amino acids and oxygen	carbon dioxide and maltose
B	carbon dioxide and glucose	alcohol and oxygen
C	carbon dioxide and urea	oxygen and protein
D	glucose and oxygen	carbon dioxide and water

64. Which statement best describes the movement of water through the stem of a plant?

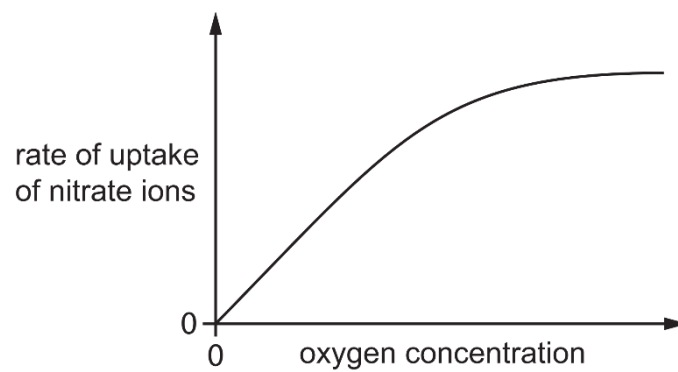
- A** Water moves up the stem as it evaporates from the leaves.
- B** Water moves up the stem as it is pushed by water entering the roots.
- C** Water moves up the stem because it is used in photosynthesis.
- D** Water moves up the stem by osmosis.

65. The diagram shows the movement of blood through a tissue.

At which labelled point is the pressure highest?

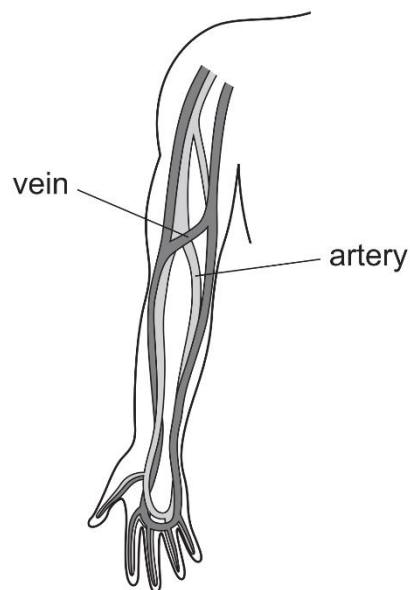


66. The graph shows the effect of oxygen concentration on the uptake of nitrate ions from the soil into a root hair cell.



What can be concluded from this information?

- A Nitrate ions enter the root hair cell by active transport.
 - B Nitrate ions enter the root hair cell by osmosis.
 - C Nitrate ions leave the root hair cell by diffusion.
 - D Nitrate ions leave the root hair cell in low oxygen concentrations.
67. The diagram shows arteries and veins in the human forearm.

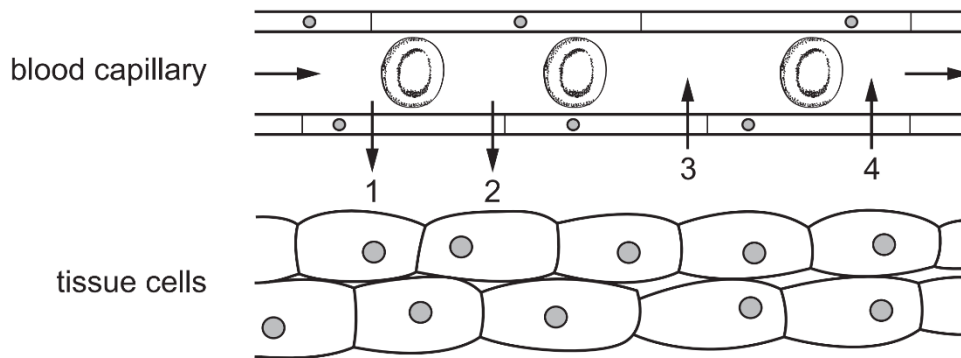


Which statements apply to a vein in the human forearm?

	carries oxygenated blood	has valves	blood is returning to the heart
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

Key:
 ✓ = yes
 ✗ = no

68. The diagram shows the transfer of materials between capillaries and tissue fluid.

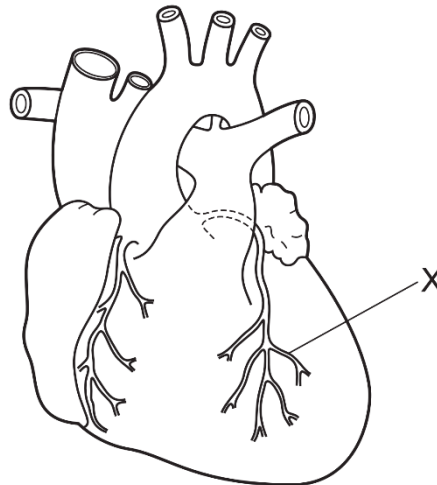


What could the numbered substances be?

	1	2	3	4
A	carbon dioxide	oxygen	urea	glucose
B	carbon dioxide	urea	oxygen	glucose
C	oxygen	glucose	carbon dioxide	urea
D	oxygen	urea	carbon dioxide	glucose

69. The diagram shows an external view of the heart.

The left coronary artery is blocked at the point labelled **X**.



How would the blockage first affect the heart?

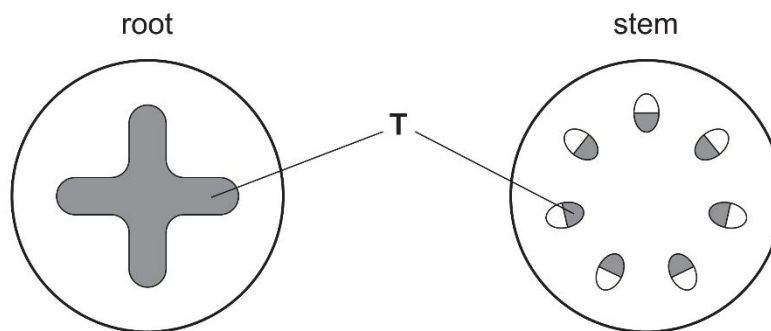
- A** Blood is prevented from entering the heart.
- B** Cells in the wall of the left ventricle die.
- C** The rate of contraction of the heart increases.
- D** The valves of the heart allow blood to flow backwards.

70. Which row describes diffusion into a cell?

	energy required from the cell	particles move down a concentration gradient
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

Key:
✓ = yes
✗ = no

71. The diagram shows cross-sections through the root and stem of the same plant.



What is tissue T?

- A Epidermis B Mesophyll
C Phloem D Xylem

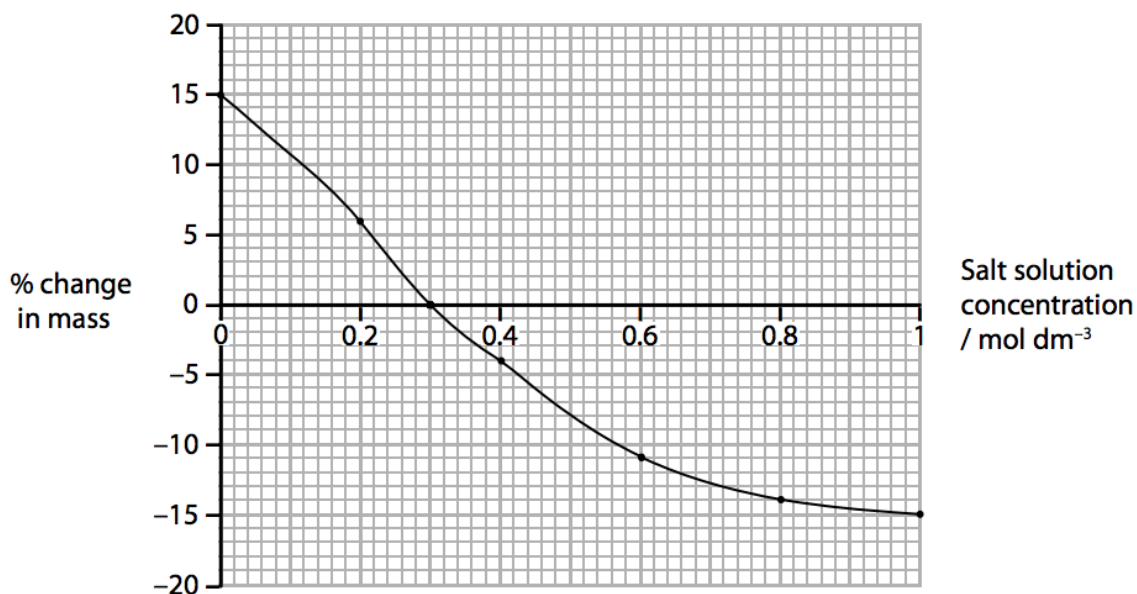
72. Four strips of potato, identical in size and mass, were each placed in a sugar solution of different concentration. After one hour, the four strips of potato were removed from the different sugar solutions, dried and measured.

Which sugar solution had the **highest** water potential?

	original length of potato strip / mm	final length of potato strip / mm
A	72	65
B	72	72
C	72	76
D	72	81

73. Strips of potato, identical in size and mass, were placed in different salt solutions ranging in concentration from 0.0 mol dm^{-3} to 1.0 mol dm^{-3} . After one hour, the strips of potato were removed from the different salt solutions, dried and weighed.

The results were plotted on a graph of percentage change in mass against concentration of salt solution. The results are shown below.



What is the concentration of the salt solution within the cells of the potato?

- A 0.0 mol dm^{-3}
- B 0.3 mol dm^{-3}
- C 0.6 mol dm^{-3}
- D 1.0 mol dm^{-3}

- To view the answers to this assignment, scan the QR code given below.



http://www.nygh.sg/lower_secondary_science/sec_two_science/sec_2_biology/multiple_choice_transport_ans.pdf