



ST JOSEPH'S INSTITUTION
END-OF-YEAR EXAMINATION 2020
(YEAR 3)

CANDIDATE
NAME

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CLASS

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INDEX
NUMBER

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BIOLOGY

6093/01

Paper 1

7 October 2020

Additional Materials : Multiple Choice Answer Sheet

45 minutes
(09:45 – 10:30)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and index number on the Answer Sheet in the spaces provided.

There are **thirty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

The use of approved scientific calculator is expected, where appropriate.

At the end of the exam paper, hand in your Question Paper and Multiple Choice Answer Sheet separately.

For Examiner's Use

Total

/ 30

This document consists of **17** printed pages including this cover page.

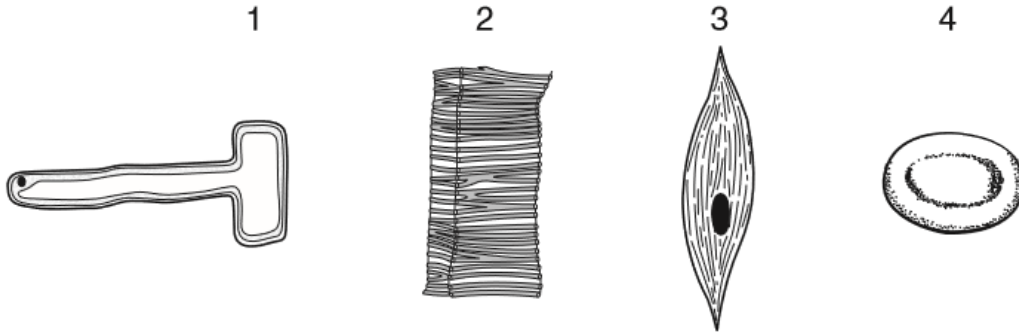
[Turn over]

1 Which substance(s) is / are not produced at the ribosomes?

- 1 amino acids
- 2 amylase
- 3 glycerol

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

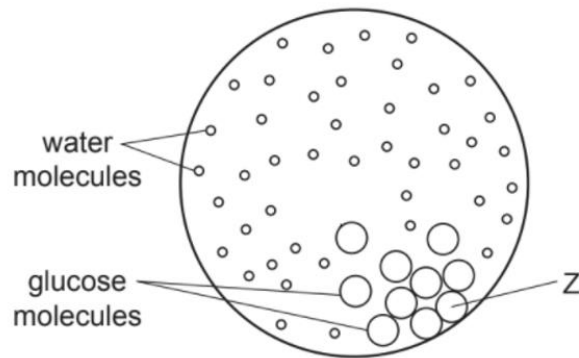
2 The diagram below shows four different cells.



Which cells are adapted to increase surface-area-to-volume ratio?

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

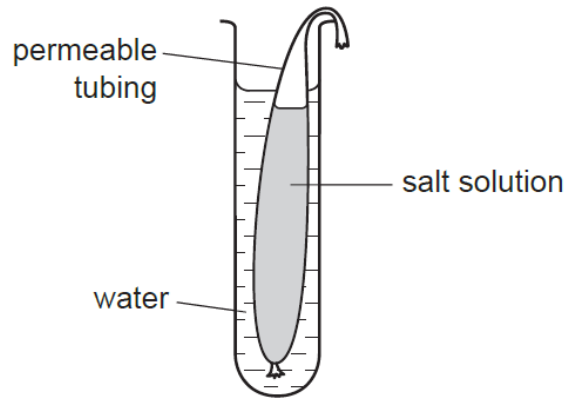
3 The diagram shows molecules of glucose and water in a solution inside a petri dish. Glucose was added to water at Z.



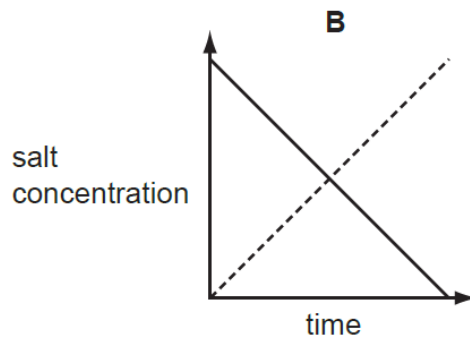
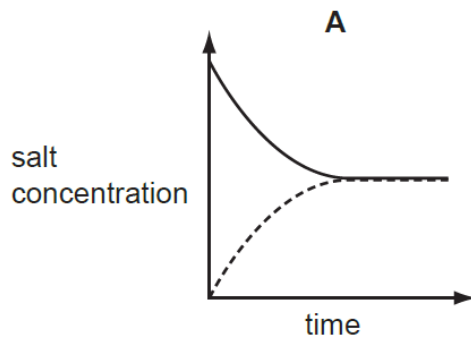
Which of the following takes place after the addition of glucose at Z?

- A** active transport only
- B** diffusion only
- C** osmosis only
- D** diffusion and osmosis

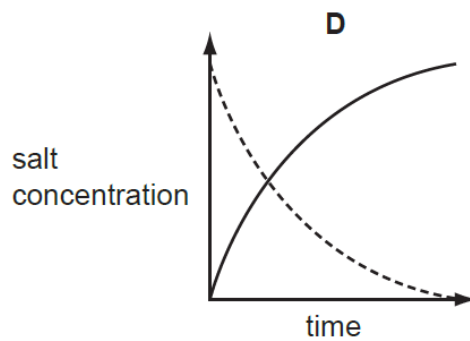
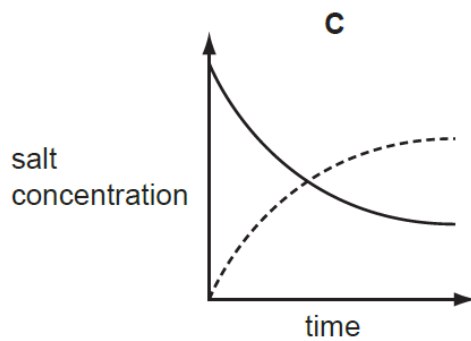
- 4 The diagram shows a permeable tubing filled with salt solution in a test-tube of water.



Which graph shows the changes in salt concentration inside and outside of the tubing after 24 hours?



key
— inside the tubing
- - - outside the tubing in the test-tube



- 5 The table shows the results of an analysis of the cell sap from a marine plant, *Valonia utricularis*, and the surrounding sea water.

substance analyzed	ionic concentration (mg/l)		
	sodium	chloride	potassium
cell sap	0.11	0.62	0.50
sea water	0.49	0.58	0.01

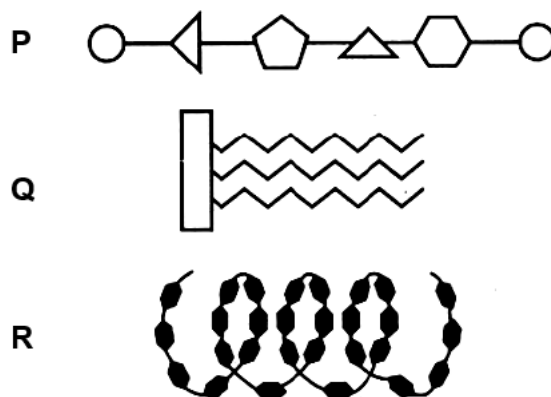
The data suggests that the marine plant

- 1 removes sodium ions by active transport.
- 2 removes chloride ions by diffusion.
- 3 accumulates sodium ions by active transport.
- 4 accumulates potassium ions by active transport.

Which of the above statements are correct?

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

- 6 The diagram shows macromolecules **P**, **Q** and **R**.



Which of the following statements is true?

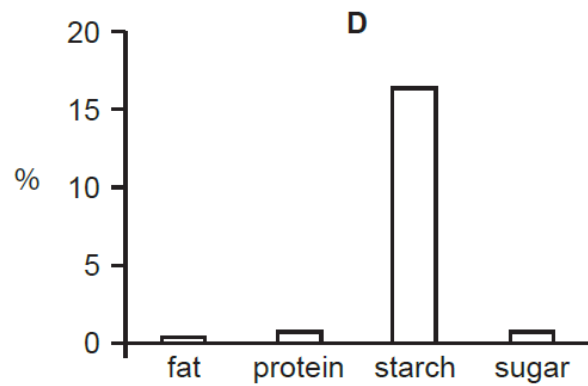
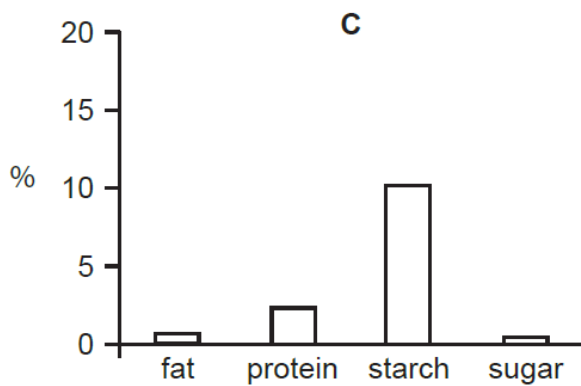
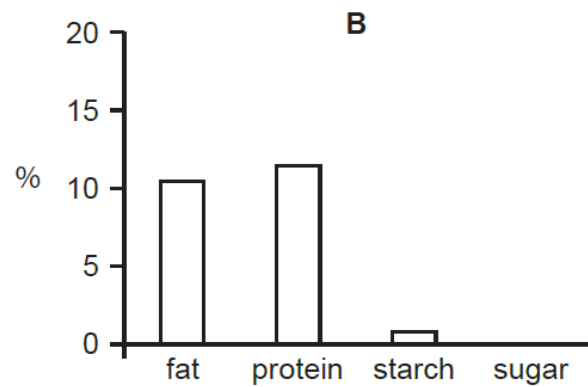
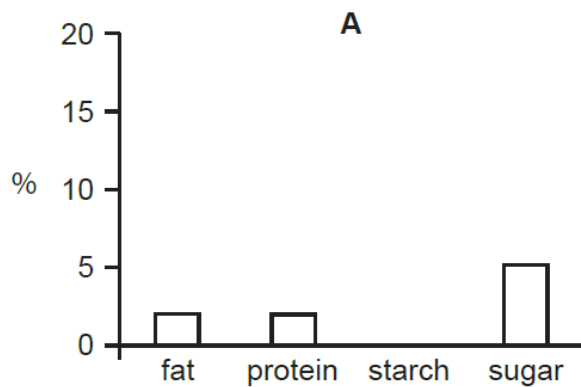
- A** **P** is an enzyme.
B **P** and **Q** are made up of the same elements.
C **R** contains the nitrogen element.
D **R** is made up of glucose.

7 By which process are complex molecules produced from simple molecules?

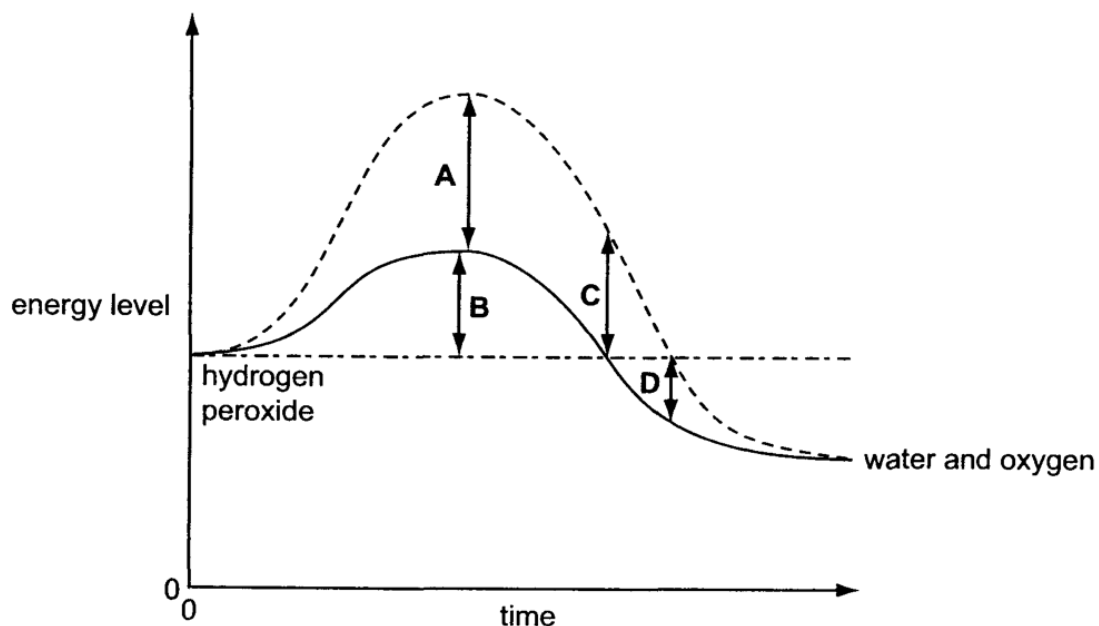
- A** deamination
- B** detoxification
- C** photosynthesis
- D** respiration

8 The bar charts show the percentages (%) of fat, protein, starch and sugar in four different types of food.

Which of the following is milk?

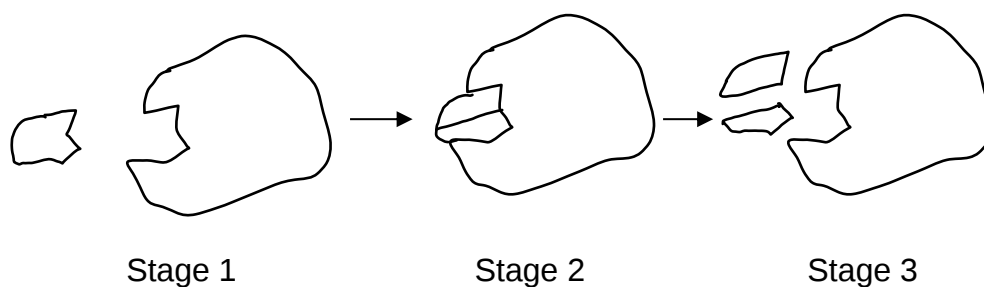


- 9 The graph below shows the energy level during the breakdown of hydrogen peroxide into water and oxygen, in the presence and absence of an enzyme, catalase.



Which of the arrows indicates the difference in activation energy of the reaction when the catalase is present as compared to when it is absent?

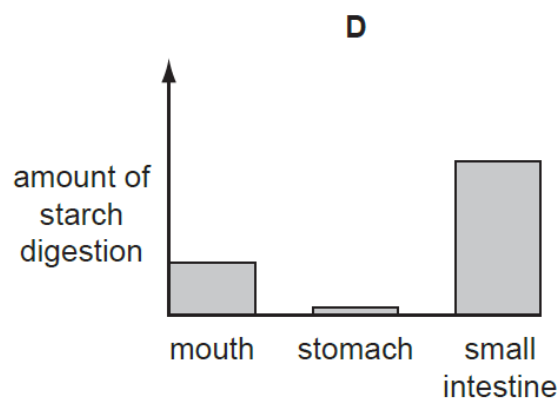
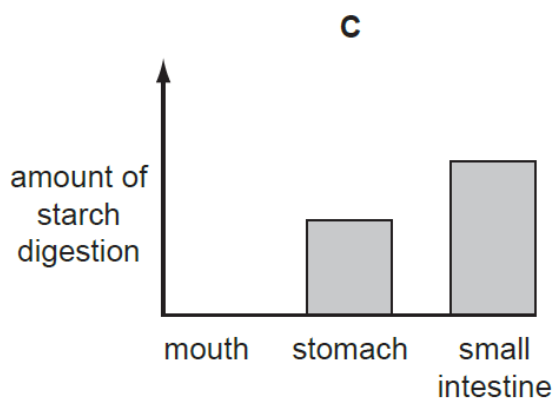
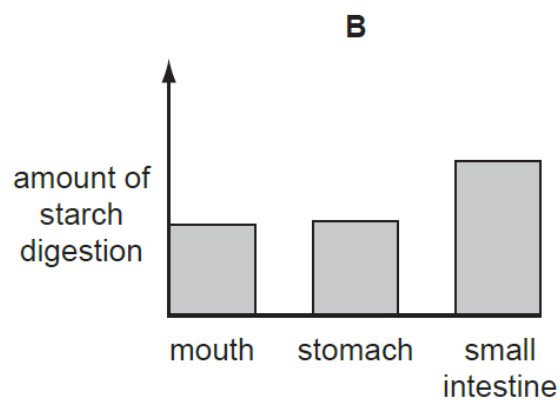
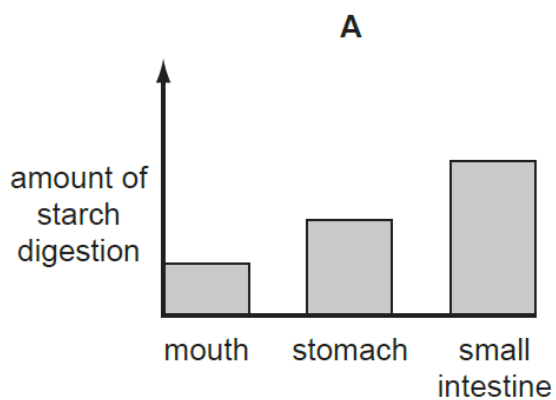
- 10 The diagram shows an enzyme action by sucrase.



If Benedict's test and biuret test are carried out at Stage 3 of this enzyme action, what will be the correct observations for the food tests?

	Benedict's test	biuret test
A	blue	pale blue
B	blue	violet
C	brick-red precipitate	pale blue
D	brick-red precipitate	violet

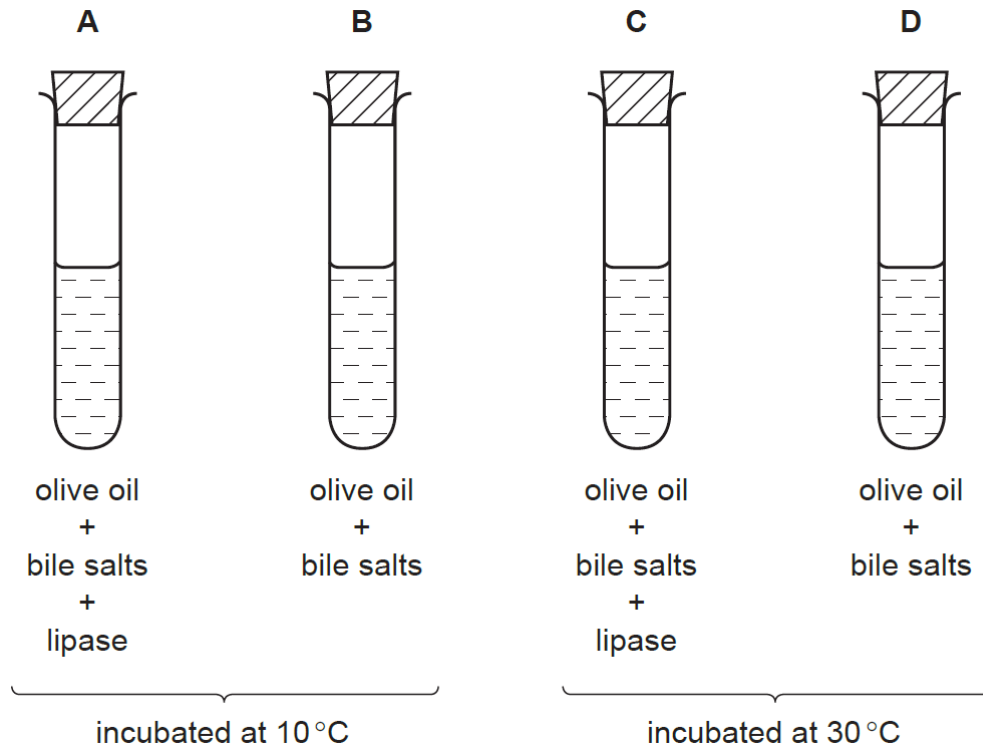
- 11** Which of the following bar charts shows the amount of starch digestion in the mouth, stomach and small intestine?



- 12** The contents of four test-tubes were set up and incubated at temperatures as shown in the diagram below.

A few drops of bromothymol blue indicator were added to each test-tube. The indicator is blue in alkalis and yellow in acids.

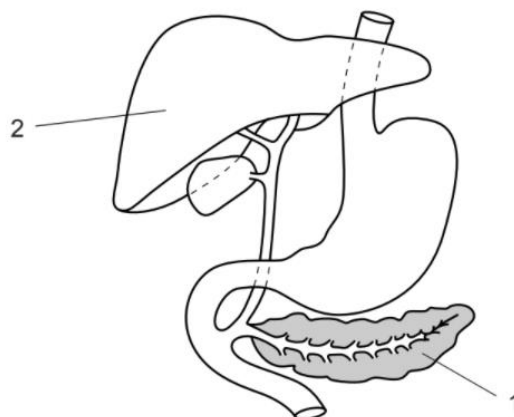
In which test-tube would the blue indicator turn yellow first?



- 13** Which molecules from food are absorbed at the villi into the blood capillaries?

- A** amino acids, fructose, water
- B** galactose, glucose, fatty acids
- C** glycerol, polypeptide, water
- D** maltose, amino acids, fatty acids

- 14 The diagram shows part of the digestive system.

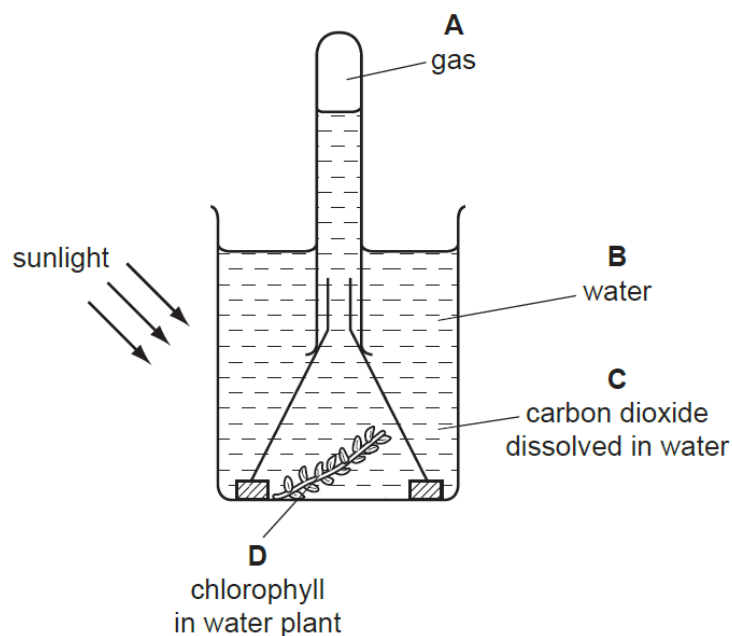


Which organ produces glucagon and in which organ does glucagon have its effect?

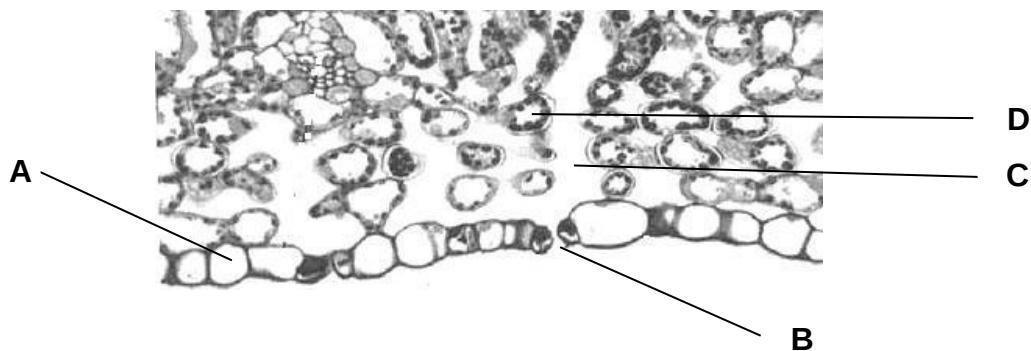
	glucagon produced in	glucagon has its effect on
A	1	1
B	1	2
C	2	1
D	2	2

- 15 The diagram shows the apparatus used to investigate the factors required for photosynthesis to occur.

Which label indicates a waste product in this process?

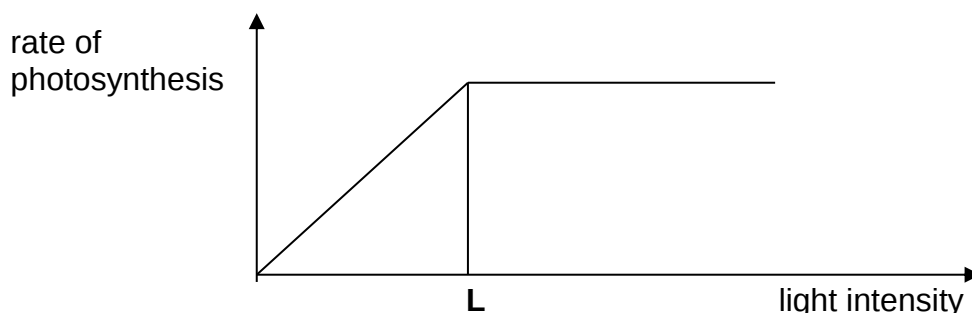


- 16** The photomicrograph shows a section of the spongy mesophyll and the lower epidermal tissue of a leaf.



At which point, **A**, **B**, **C** or **D**, will the concentration of carbon dioxide be the lowest when the plant is exposed to a high light intensity?

- 17** An experiment was conducted in which *Elodea* in pond water was exposed to different light intensities. The rate of photosynthesis was recorded and the results are shown in the graph below.



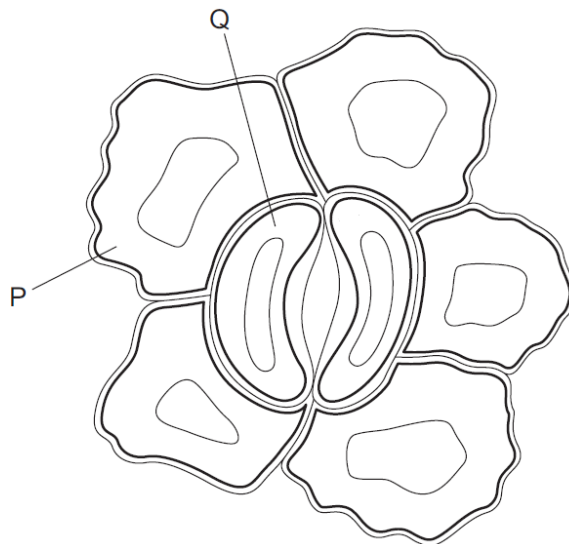
The following are four limiting factors in the biological processes in the *Elodea*.

- 1 light intensity
- 2 carbon dioxide concentration in the water
- 3 temperature of the water
- 4 oxygen content of the water

Out of the four limiting factors, which two are able to limit the rate of photosynthesis at light intensities greater than **L**?

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

- 18** The diagram shows cells in the epidermis of a leaf.



To complete the diagram, which structural features should be added to cells P and Q?

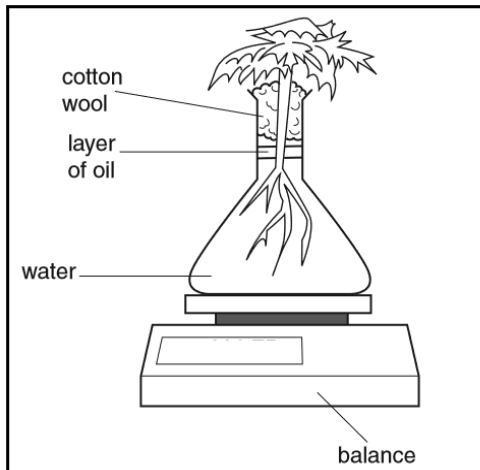
	chloroplast	nucleus
A	P only	Q only
B	Q only	P only
C	Q only	P and Q
D	P and Q	P and Q

- 19** Food tests were conducted on the liquid extracted from the phloem of a plant.

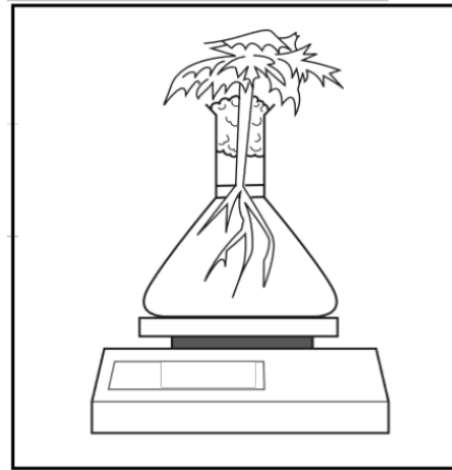
Which result shows the correct outcome of the tests?

	iodine test	Benedict's test	biuret test
A	negative	negative	negative
B	negative	positive	negative
C	negative	positive	positive
D	positive	positive	positive

- 20** The diagrams show two setups, in which a plant is placed in each flask of water. One setup is placed in a dark room while the other is placed in a brightly-lit room.



setup **P**: in brightly-lit room



setup **Q**: in dark room

The initial mass of each setup was recorded at the beginning of the experiment. After 6 hours, the mass of each setup was recorded again.

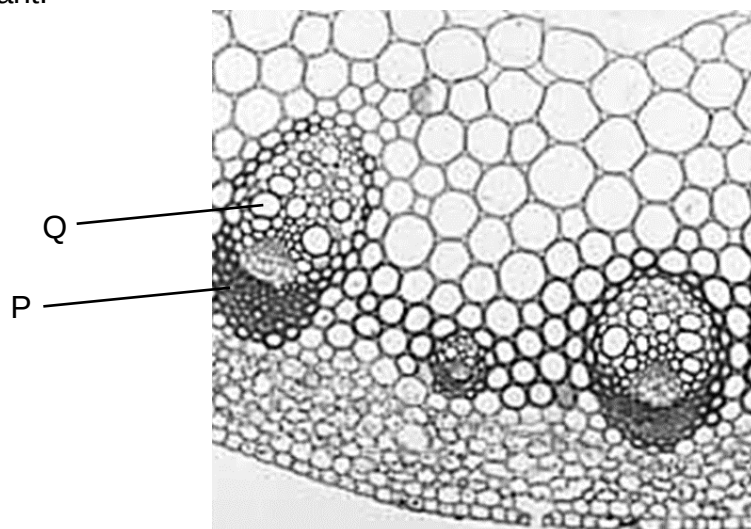
Which of the following explains why the difference in mass of setup **Q** is lesser compared to that of setup **P**?

- A** Higher light intensity in room **P** caused higher rate of evaporation of water.
- B** Higher light intensity in room **P** caused the concentration of water vapour surrounding the stomata of the plant to decrease.
- C** Lower light intensity in room **Q** caused the concentration of water vapour surrounding the stomata of the plant to decrease.
- D** Lower light intensity in room **Q** caused the guard cells to be flaccid.

- 21** Which of the following best describes a sieve tube cell?

- A** absence of cross walls between cells
- B** absence of cytoplasm
- C** absence of organelles such as nucleus
- D** high rate of aerobic respiration occurs

- 22** A plant, growing in a nutrient solution, is placed in a well-lit experimental chamber through which humid air is passed slowly. The diagram below shows a section through a part of the plant.



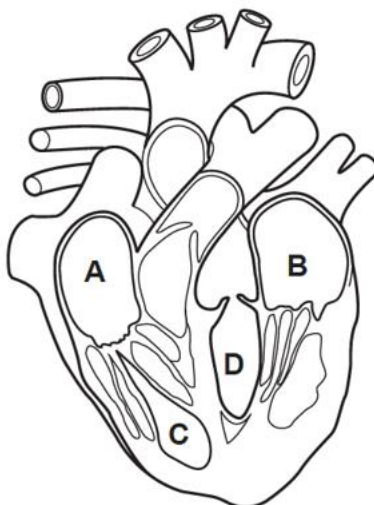
The speeds of movement of the fluids in tissues P and Q are measured. The humid air is then replaced by dry air and the speeds of movement of the fluids change.

What would be the changes at P and Q?

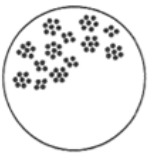
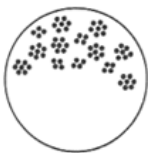
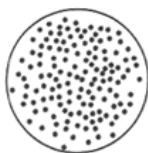
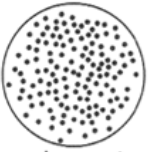
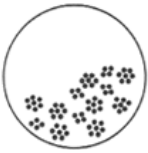
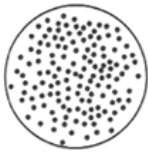
	tissue P	tissue Q
A	greatly increased upward movement	greatly increased downward movement
B	greatly increased downward movement	little change
C	little change	greatly increased downward movement
D	little change	greatly increased upward movement

- 23** In a medical investigation, a dye was injected into the hepatic portal vein of a patient.

Which chamber of the heart would be the first to receive blood with this dye in it?



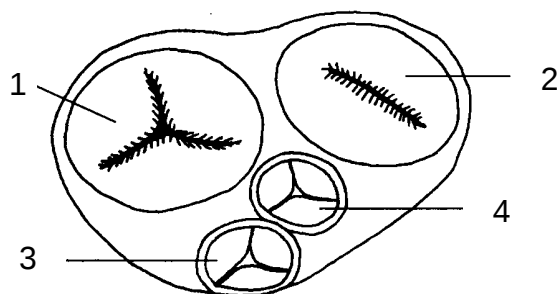
- 24** The diagram shows the test results of blood group testing of three people, Jack, Jacob and Jerry.

blood of person	Jack	Jacob	Jerry
serum containing anti-A antibody	 clumps	 clumps	 no clumping
serum containing anti-B antibody	 no clumping	 clumps	 no clumping

Which of the following correctly identifies their blood groups?

	Jack	Jacob	Jerry
A	A	AB	O
B	A	O	AB
C	B	AB	O
D	B	O	AB

- 25** The diagram below shows a cross section of a mammalian heart with the structures of various valves. The parts are not drawn to the same scale.



Which of the valves will close when the ventricles contract?

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

26 When blood clots, the following events take place.

- 1 a network of fibres is formed
- 2 fibrinogen is changed to fibrin
- 3 platelets are in contact with torn tissue
- 4 red blood cells and platelets are trapped
- 5 prothrombin is changed to thrombin

What is the correct order of these events?

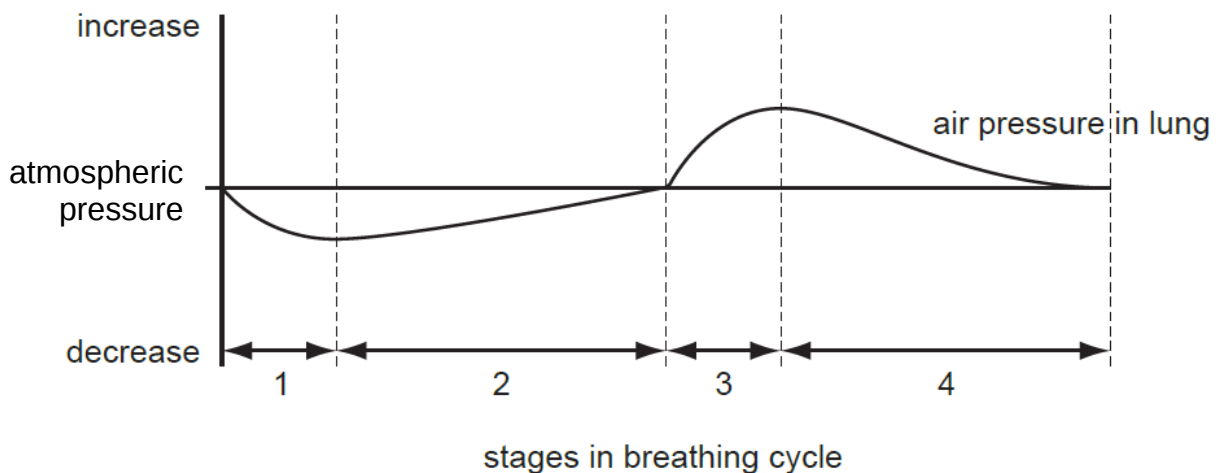
- A** 3 → 2 → 5 → 1 → 4
B 3 → 5 → 2 → 1 → 4
C 4 → 3 → 2 → 5 → 1
D 4 → 3 → 5 → 2 → 1

27 Fitness training increases the concentration of lactic acid that athletes can tolerate in their muscles.

What is the cause for the increase in lactic acid in the muscles that are undergoing strenuous contractions?

- A** high concentration of carbon dioxide
B high concentration of glycogen
C low concentration of glucose
D low concentration of oxygen

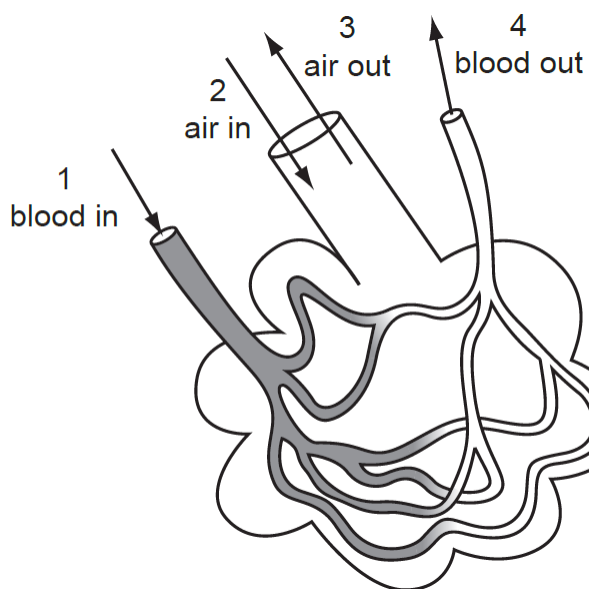
28 The graph shows the changes in air pressure in the lungs during breathing.



During which of the stages in breathing does inhalation occur?

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

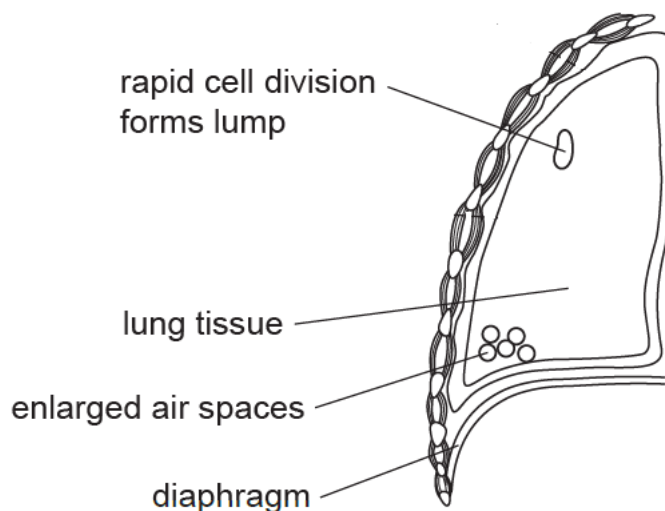
29 The diagram shows an alveolus and its blood supply.



Which of the numbered labels indicate parts that have the highest concentration of carbon dioxide and oxygen?

	highest concentration of carbon dioxide	highest concentration of oxygen
A	1	2
B	1	3
C	3	4
D	4	3

30 The diagram shows one of the lungs of a person who is suffering from two lung diseases.



Which components of cigarette smoke could be the cause of these diseases?

	rapid cell division that forms lump	enlarged air spaces
A	carbon monoxide	nicotine
B	nicotine	tar
C	tar	carbon monoxide
D	tar	tar

End of Paper