

2024 PRELIMINARY EXAMINATION

Secondary 4 Express / 4 Normal Academic (SBB)

NAME

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CLASS

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REG. NO

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SCIENCE (CHEMISTRY/BIOLOGY)

5088 / 01

Paper 4 Biology

Paper 1: 1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

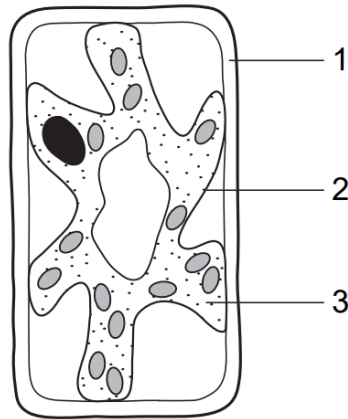
Answer **one** question.

Write your answers in the spaces provided on the question paper.

The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE	
Total	

- 1** The diagram shows a typical plant cell after being placed in a concentrated salt solution for ten minutes.



Which numbered structure(s) is / are partially permeable?

- A** 1 only
- B** 2 only
- C** 1 and 2 only
- D** 1 and 3 only
- 2** The table below shows the comparison between a red blood cell and a root hair cell.

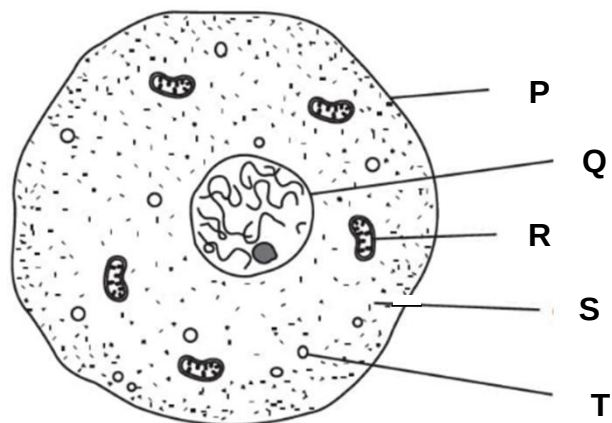
feature number	feature	red blood cell	root hair cell
1	transport oxygen	yes	yes
2	cytoplasm present	no	yes
3	large surface area to volume ratio	yes	yes
4	nucleus present	no	yes

Which comparisons are correct?

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

D 3 and 4 only

3 The diagram shows an animal cell.



Which labelled parts show a mitochondrion and a ribosome?

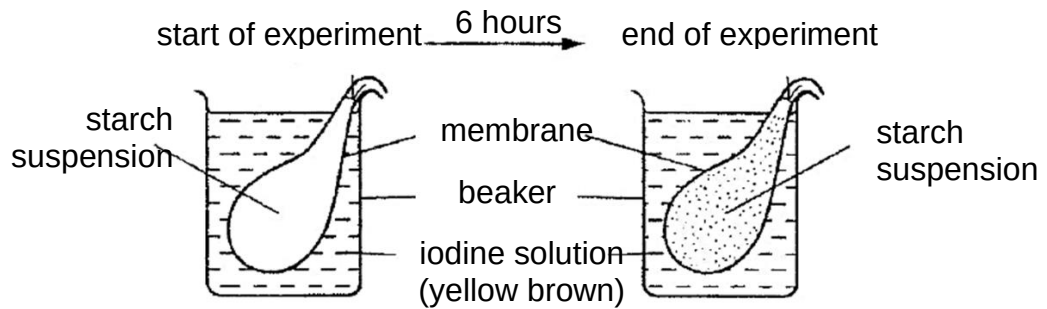
	mitochondrion	ribosome
A	R	P
B	R	S
C	I	P
D	I	S

4 The cell wall of a plant cell is removed using an enzyme.

What would happen if this cell were then placed in distilled water?

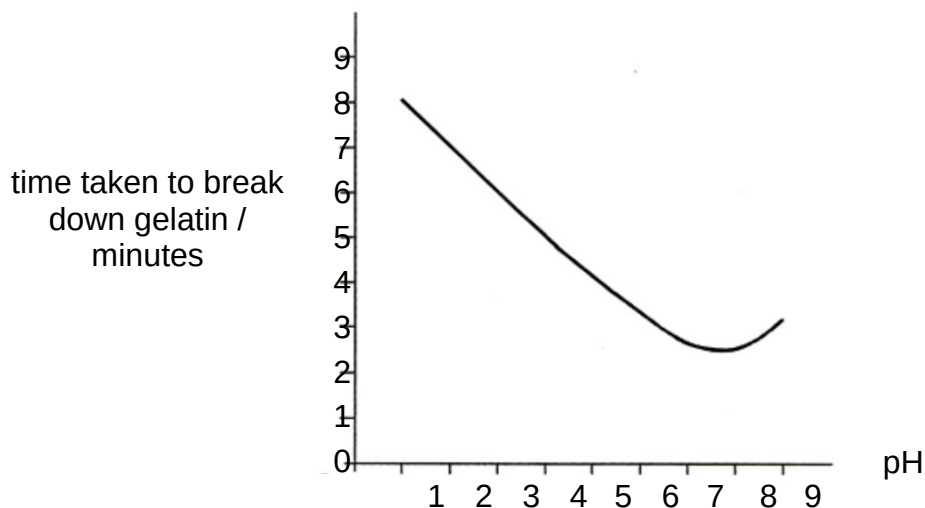
- A** It would take longer for the cell to become turgid.
- B** The cell would become plasmolysed.
- C** The cell would become smaller as water moves out.
- D** The cell would burst as water moves into it.

- 5 The diagram shows an experiment.



Why did the starch suspension change colour?

- A Iodine molecules have diffused in through the membrane.
 - B Iodine molecules have diffused out through the membrane.
 - C Starch molecules have diffused in through the membrane.
 - D Starch molecules have diffused out through the membrane.
- 6 The diagram shows the effect of different pH on the time taken for a protease to digest gelatin (a fibrous protein).



What can be concluded from the graph?

- A The enzyme is denatured at pH 9.
- B The enzyme is inactive at pH 2.
- C The lowest amount of substrate remaining would be at pH 7.5.

D The maximum amount of products formed will be at pH 1.

7 Some processes that occur in the body are listed.

- | | |
|---|-----------------------------------|
| 1 | breakdown of excess amino acids |
| 2 | conversion of glycogen to glucose |
| 3 | digestion of fats |
| 4 | formation of bile |
| 5 | storage of starch |

Which processes occur in the liver?

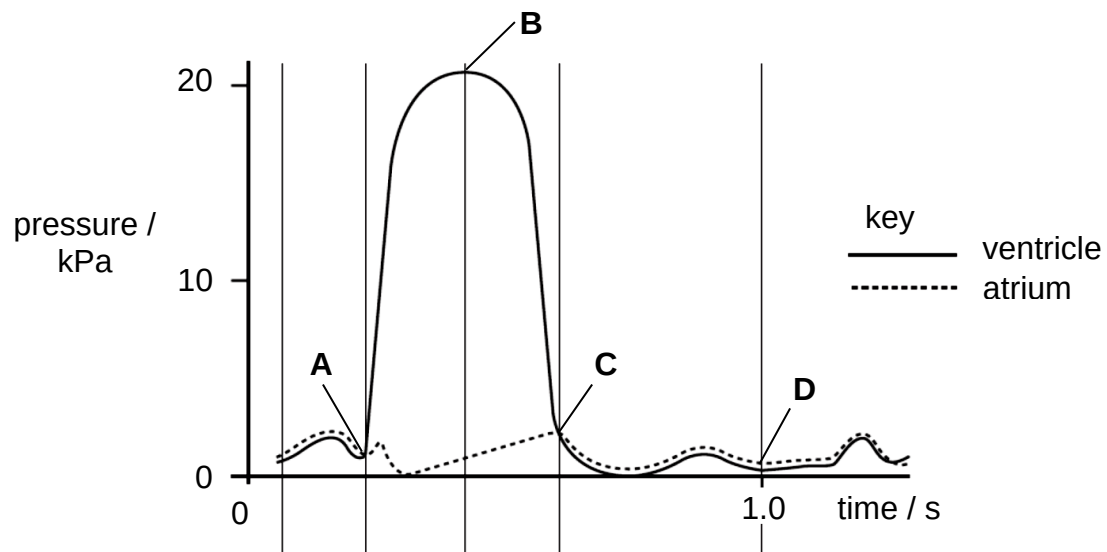
- A** 1, 2 and 4 only
- B** 1 and 3 only
- C** 2, 4 and 5 only
- D** 4 and 5 only

8 Which blood vessel carries the greatest concentration of glucose and amino acids after a meal?

- A** aorta
- B** hepatic portal vein
- C** pulmonary artery
- D** renal artery

- 9 The graph shows pressure changes in the left ventricle and the left atrium in one cycle of contraction of the heart.

At which time does the bicuspid valve start to open?



- 10 Which substance in cigarette smoke increases heart rate?

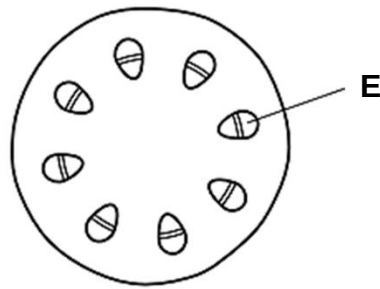
- A carbon monoxide
- B nicotine
- C smoke particles
- D tar

- 11 Which of the following statements are correct?

- 1 Avoid touching eyes, nose and mouth to reduce transmission of pneumococcal disease.
- 2 One of the signs of pneumococcal disease is a fever.
- 3 One of the symptoms of influenza is sore throat.
- 4 Some antibiotics can kill viruses.

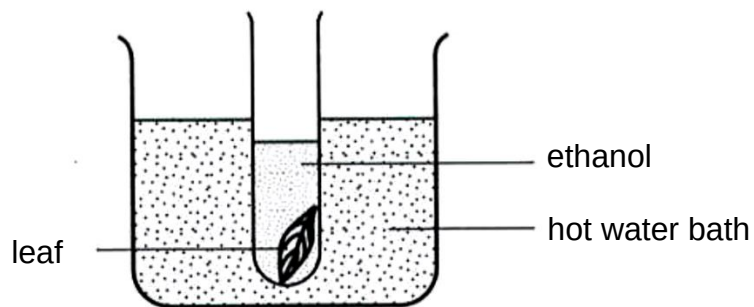
- A 1 and 2 only
- B 2 and 3 only
- C 3 and 4 only
- D 1, 2 and 3 only

- 12** The diagram shows a section through a plant stem.



Which process is responsible for moving substances in region **E**?

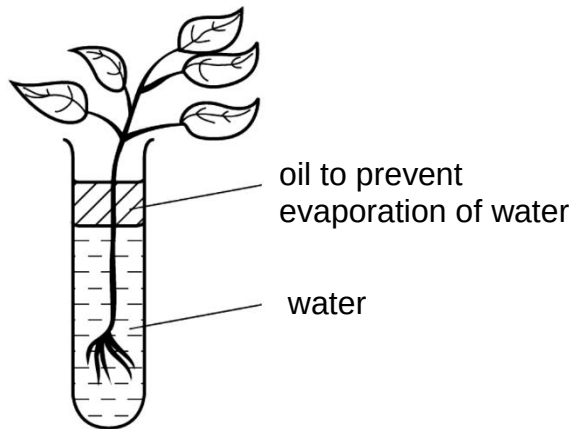
- A** diffusion
 - B** osmosis
 - C** translocation
 - D** transpiration
- 13** The diagram below shows an experiment to test for the presence of starch in a leaf.



What is the purpose of the procedure shown in the diagram?

- A** breakdown the cell wall of the leaf
- B** soften the leaf for iodine test
- C** stain the leaf for viewing under microscope
- D** remove chlorophyll in the leaf

14 Five similar plants are placed in test-tubes as shown.



Some of the plants have their leaves coated with grease to reduce transpiration. Each plant is weighed in its test-tube at the start of the experiment and again two days later. The results are shown in the table below.

	mass / g				
	plant 1	plant 2	plant 3	plant 4	plant 5
start of experiment	105	121	107	111	119
after two days	103	97	84	110	93

Which plants had their leaves coated with grease?

- A** plant 1 and plant 2
- B** plant 1 and plant 4
- C** plant 2, plant 3 and plant 5
- D** plant 2 and plant 5

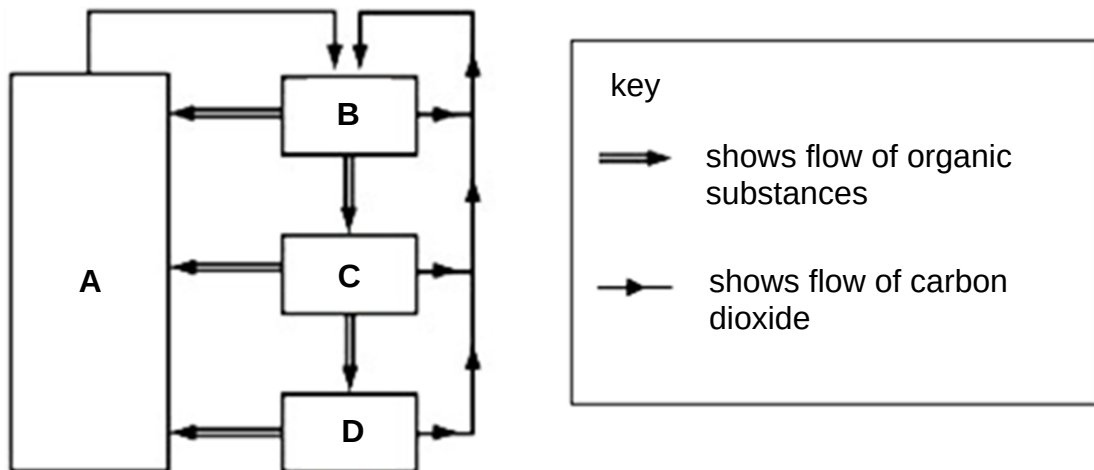
- 15** Mealybugs are small insects that can feed on crops such as mango and coffee. They damage the crops and reduce the yield and profits for farmers. Lacewing insects and ladybird beetles both eat mealybugs.

Which row shows the positions of some of the organisms in this food chain?

	producer	herbivore	carnivore
A	coffee	mealybug	lacewing
B	lacewing	mealybug	coffee
C	mango	ladybird	mealybug
D	mealybug	ladybird	mango

- 16** The diagram represents the flow of substances within a balanced ecosystem. The boxes represent the various trophic levels.

Which box represents herbivores?



17 Which statements below correctly describe the functions carried out only by mRNA?

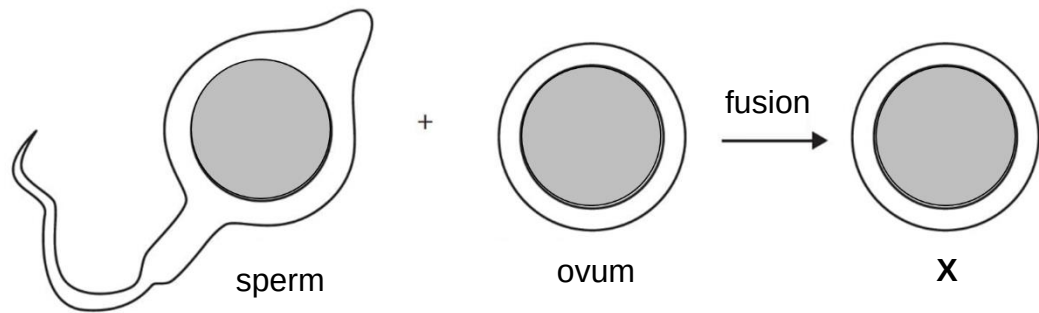
- 1 carry a genetic code sequence out of the nucleus
- 2 carry a genetic code sequence to a ribosome
- 3 carry an amino acid to a ribosome

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

18 Which pair of sex cells will develop into a baby with Down's syndrome?

	number of chromosomes in egg	number of chromosomes in sperm
A	23	23
B	24	23
C	24	24
D	47	47

19 Fertilisation and early development in humans are shown.



Identify **X**?

- A** baby
 - B** embryo
 - C** nucleus
 - D** zygote
- 20** Which factor is **least** likely to increase the rate of mutation?
- A** exposure to UV radiation
 - B** exposure to X-ray radiation
 - C** inhaling carbon dioxide
 - D** smoking tobacco