

Name

Reg. No

Class

4EX

SCIENCE (CHEMISTRY, BIOLOGY)

5088/01

Paper 1 Multiple Choice [20 Marks]

**PRELIMINARY EXAMINATION
AUGUST 2024**

Additional Materials:

Approved calculator
OTAS

1 hour

Instruction to Candidates

Do not start reading the questions until you are told to do so.

Write in soft pencil.

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

Write your name, class, and index number on the OTAS provided.

Information for Candidates

There are **twenty** 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 OTAS.

Read the instructions on the OTAS very carefully.

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

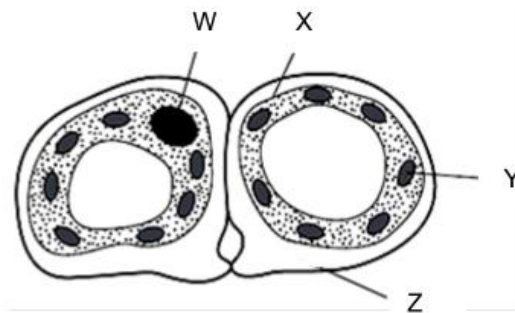
Any rough working should be done in this booklet.

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

Paper 1 (25 marks)

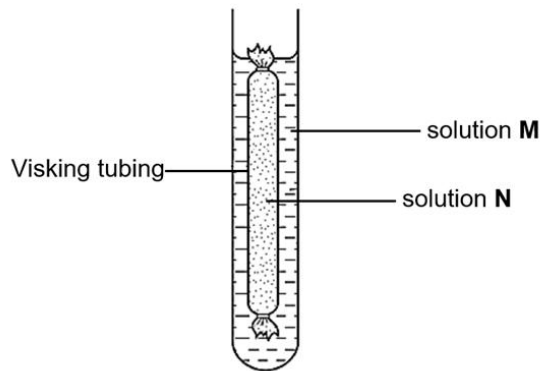
Answer all questions in the OTAS provided.

- 1 The diagram shows a cross section through two guard cells of a leaf.



Which labelled structures would also be found in an animal cell?

- A W and X B W and Z C X and Y D Y and Z
- 2 The diagram shows an experiment to investigate the process of osmosis.



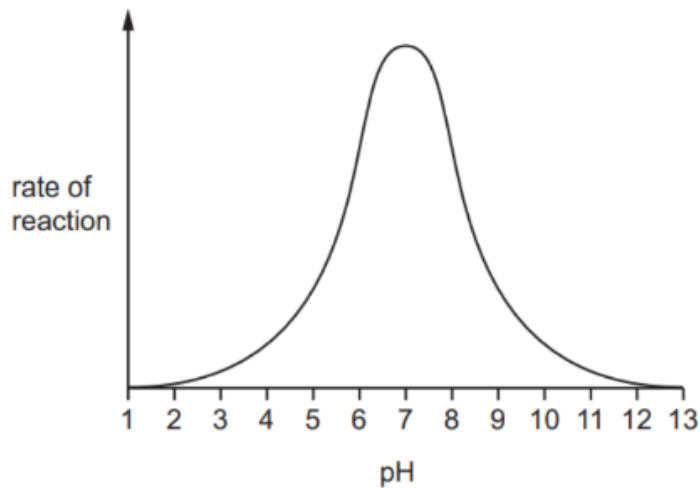
The results are shown in the table.

	mass of Visking tubing and contents/g
before experiment	10.0
after experiment	12.8

Which statement best describes solutions **M** and **N**?

- A Solution M is 4% salt solution and solution N is water.
- B Solution M is 4% salt solution and solution N is 4% salt solution.
- C Solution M is 4% salt solution and solution N is 10% salt solution.
- D Solution M is 10% salt solution and solution N is 4% salt solution.
- 3 Which of the four substances listed below will give a violet colour when tested with biuret solution?
- A cellulose
- B fats
- C glycogen
- D protein

- 4 The graph shows the effect of pH on a particular enzyme-controlled reaction.

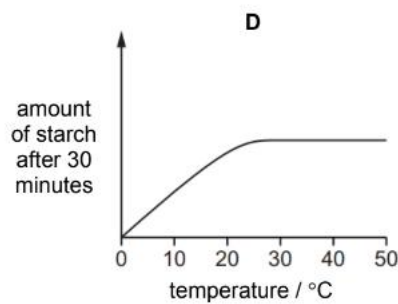
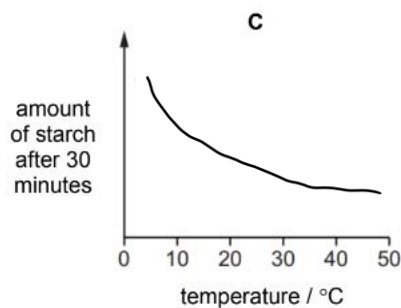
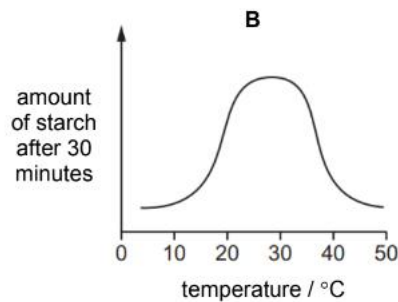
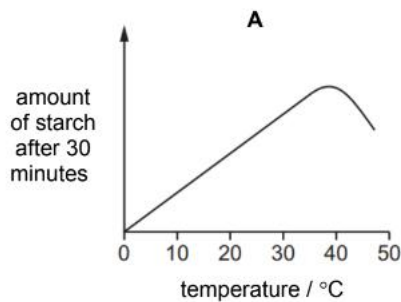


When is the enzyme **fully** denatured?

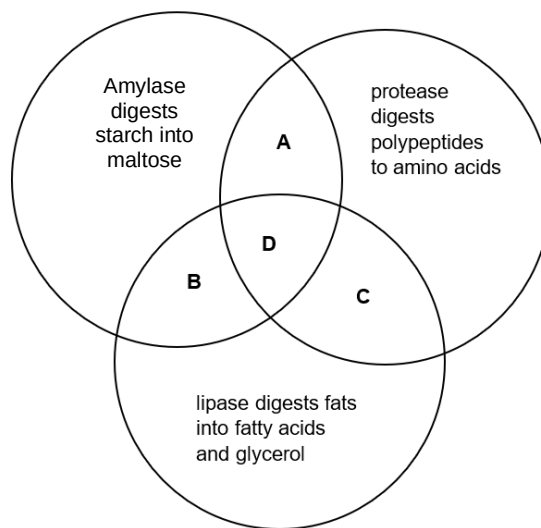
- A pH 1 and pH 13
 - B pH 3 and pH 11
 - C pH 5 and pH 9
 - D pH 7
- 5 Amylase is an enzyme that breaks down starch to maltose. A student set up an experiment to investigate the effect of different temperatures on the action of amylase on starch solution.

He measured the amount of starch remaining after 30 minutes at different temperatures.

Which graph would you expect the student to draw from his result?

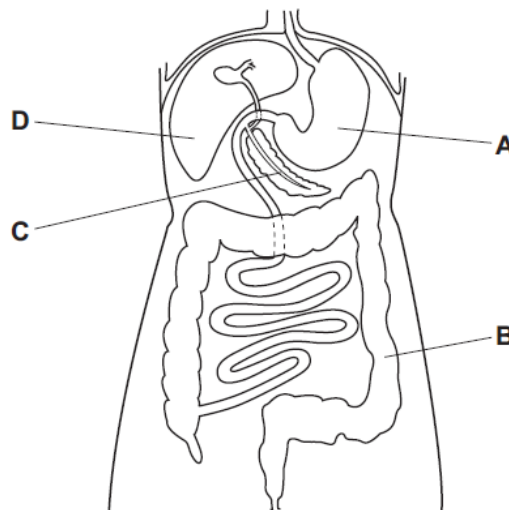


- 6 Which section of the diagram represents the functions carried out by the small intestine?

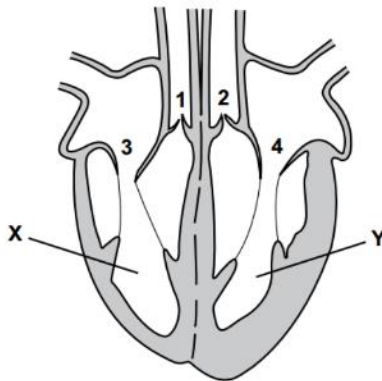


- 7 The diagram shows some organs in the human body.

In which part are amino acids broken down to form urea?



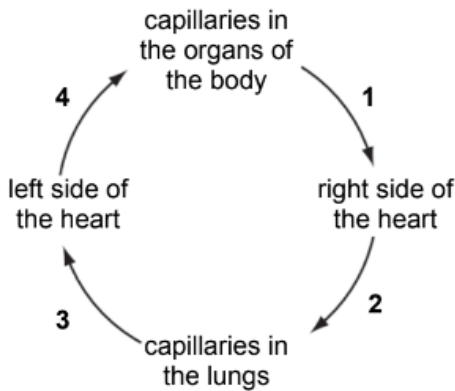
8 The diagram shows a section through the heart.



While the muscles of chambers X and Y are contracting, which valves are open and which are closed?

	valves 1 and 2	valves 3 and 4
A	closed	closed
B	closed	open
C	open	closed
D	open	open

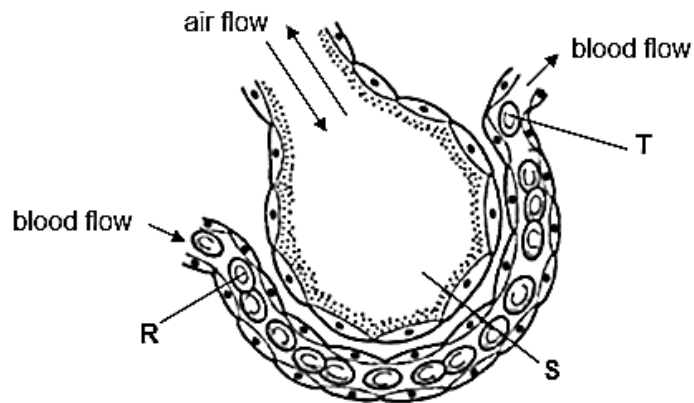
9 The diagram shows blood flow through the human body.



At which stages does the blood contain the least oxygen?

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

- 10** The diagram shows a section of an alveolus in the lung of a mammal.

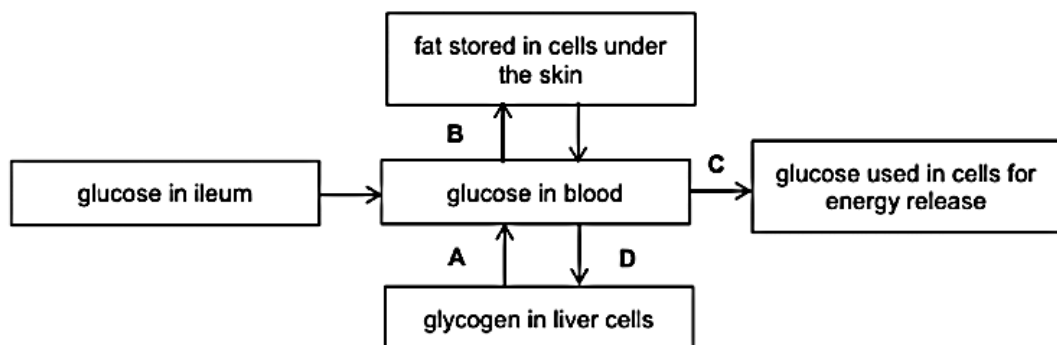


What are the oxygen concentrations in the three parts labelled R, S and T?

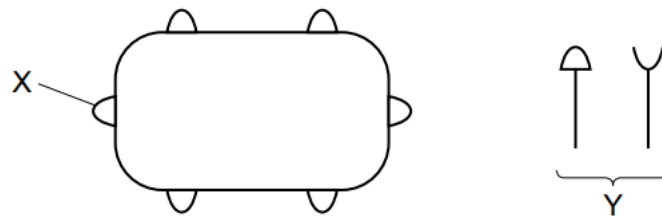
	R	S	T
A	low	high	low
B	low	high	high
C	high	high	low
D	high	lo	low

- 11** The diagram shows what happens to glucose in the human body.

Which change (**A – D**) is controlled by insulin in liver?



- 12** The diagram with the structure labelled **X** shows a bacterium with proteins on its surface. The diagram labelled **Y** shows proteins made by the human body.



Which row shows the correct combination for destroying the bacterium?

	name of X	name of Y	correct shape of Y
A	antigen	antibody	
B	antibody	antigen	
C	antigen	antibody	
D	antibody	antigen	

- 13** The table shows the energy in four trophic levels, **W**, **X**, **Y**, and **Z**, in a grassland community.

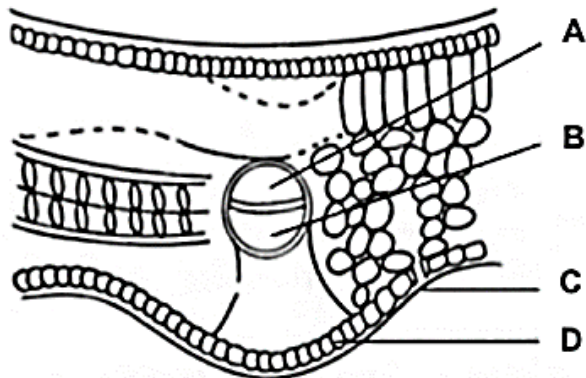
trophic level	energy in trophic level (kJ/ha)
W	10
X	70
Y	580
Z	6400

Which statement of this grassland community is correct?

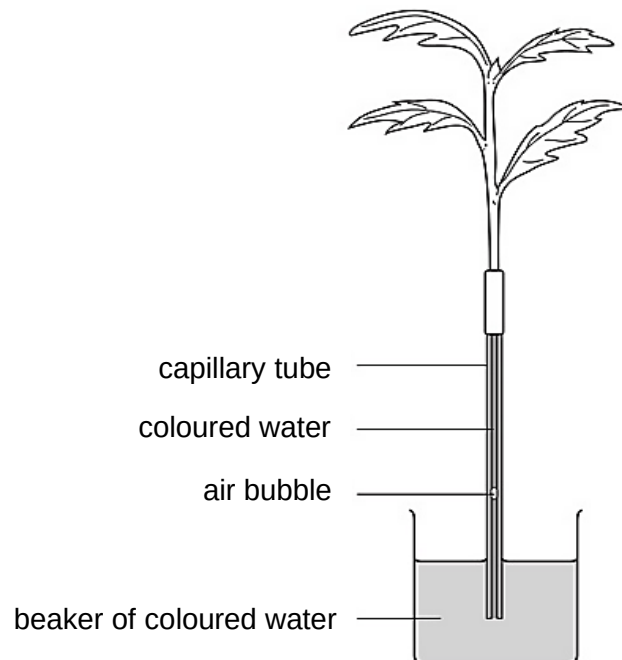
- A** Energy accumulates as it flows from organism W to organism Z.
- B** Light energy is converted to chemical energy by organism W.
- C** Most of the energy that flows from Z to Y is lost as heat energy.
- D** Organism Z represents decomposers.

- 14 The diagram shows a transverse section of a dicotyledonous leaf.

Which part of the plant carries water for photosynthesis?



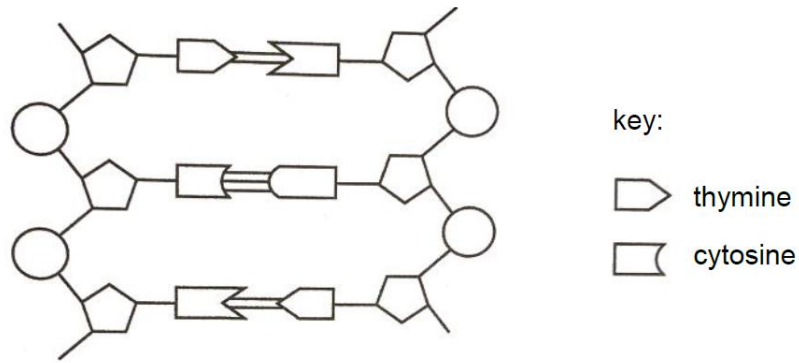
- 15 The diagram shows a potometer used to measure water uptake by a leafy twig.



Which of the following will cause the greatest increase in the rate at which the air bubble is drawn up the capillary tube?

- A increase in humidity of the surroundings only
- B increase in temperature of the surroundings only
- C increase in temperature and humidity of the surroundings
- D increase in temperature and decrease in humidity of the surroundings

16 The diagram shows a short section of a molecule of DNA.



Which row correctly identifies the shapes used in the diagram?

				
A	phosphate group	sugar	adenine	guanine
B	phosphate group	sugar	guanine	adenine
C	sugar	phosphate group	adenine	guanine
D	sugar	phosphate group	guanine	adenine

17 Which statement about chromosomes is correct?

- A** Chromosomes are long DNA molecules called genes which are divided into sections.
- B** Chromosomes include a long molecule of DNA divided into sections called genes.
- C** Genes are divided into sections called chromosomes.
- D** Genes include long DNA molecules called chromosomes.

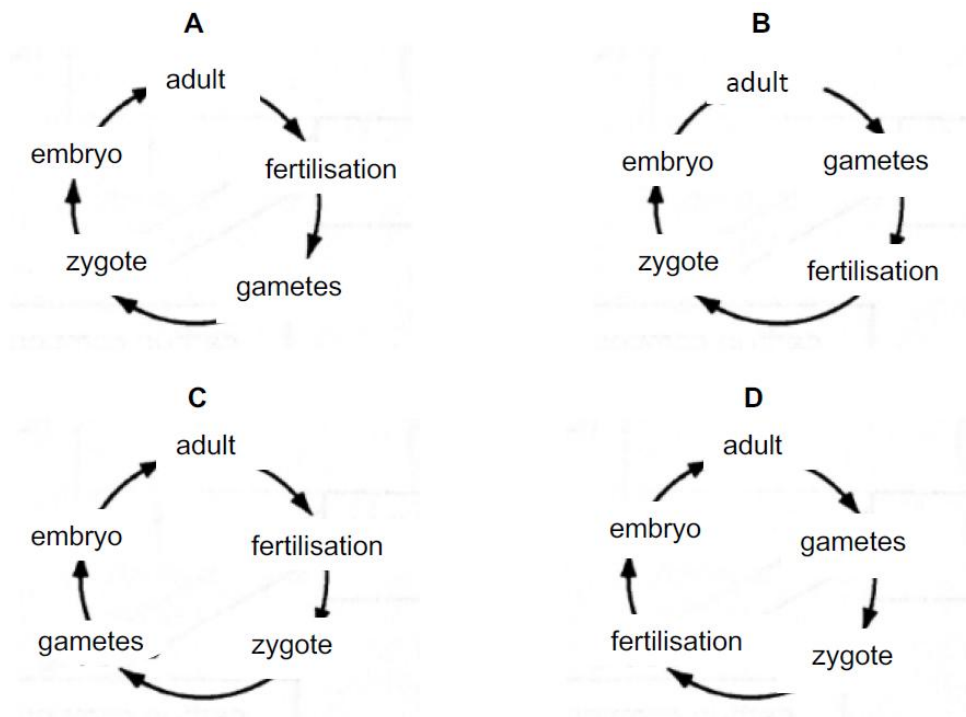
- 18** Two persons have mutations in their cells.

One has sickle cell anaemia and the other has Down's syndrome.

What is the type of mutation and how many chromosomes do they have in their body cells?

	sickle cell anaemia		Down's syndrome	
	type of mutation	number of chromosomes in body cells	type of mutation	number of chromosomes in body cells
A	chromosome	24	gene	47
B	chromosome	23	gene	46
C	gene	46	chromosome	47
D	gene	47	chromosome	23

- 19** Which diagram shows the order of the main stages of the human reproductive cycle?



- 20** In sexual reproduction in humans, why are sperm cells produced in much greater numbers than egg cells?

- A** More than one sperm cell fertilises an egg.
- B** Sperm cells are small.
- C** Sperm cells live for only a short time.
- D** The chance of one sperm cell reaching an egg is very small.

---End of Paper ---