NT

SINGAPORE – CAMBRIDGE
General Certificate of Education Normal (Technical) Level

CANDIDATE NAME	

CENTRE NUMBER	S					INDEX NUMBER			

SCIENCE SYLLABUS T

5148/02

Paper 2

For examination from 2024

SPECIMEN PAPER

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre Number, index number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
The use of an approved scientific calculator is expected, where appropriate.
Do not use staples, paper clips, glue or correction fluid.

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

This document consists of **10** printed pages.

Singapore Examinations and Assessment Board

Answer **all** the questions in this paper in the spaces provided

1 Complete the sentences below using words from the list.
Each word may be used once, more than once or not at all.

chloride **higher** **limewater**

lower **nitrate** **litmus**

Compared to inhaled air, exhaled air contains a.....

amount of carbon dioxide (tested by using .....).

Exhaled air has a ..... amount of water vapour

(tested by using dry cobalt ..... paper). [4]

2 **(a)** Complete the table with the food preservation methods and the effect of the method on microbes.

method	**effect on microbes**
bottling	reduces activity by removing oxygen
	reduces activity by removing water
	reduces activity by lowering pH
sterilisation	

[3]

(b) Give a use for each food additive.

(i) starch.....[1]

(ii) sulfur dioxide .....[1]

(c) State one health problem caused by a diet containing high levels of each food additive.

(i) sugar.....[1]

(ii) salt..... [1]

3 Two people are carried by a chair lift to the top of a hill with constant speed. Each person weighs 600 N. The lift motor operates for 10 min. At the top of the hill, the gravitational potential energy of the people has increased by 240 000 J.

Use the information below to answer the questions that follow.

Power = energy / time

(a) State the form of energy that is directly converted into gravitational potential energy as the two people are lifted.

.....[1]

(b) Calculate

(i) the total force used to lift the two people.

.....N [1]

(ii) the power supplied by the motor to lift the two people.

..... W [2]

(c) The motor is supplied with 800 000 J of electrical energy during the ten minutes. Suggest what happens to the energy supplied to the motor that is not converted into the gravitational potential energy of the two people.

.....

.....[1]

4 Keeping the body healthy depends on a number of factors.

(a) What does the term 'BMI' stand for?

B..... M..... I..... [1]

(b) State how the following can be damaging to the body.

(i) Undereating

.....

.....[1]

(ii) Over-exercising

.....

.....[1]

(c) State two important things that an individual can do to maintain good physical health.

1. .....

2. .....

[2]

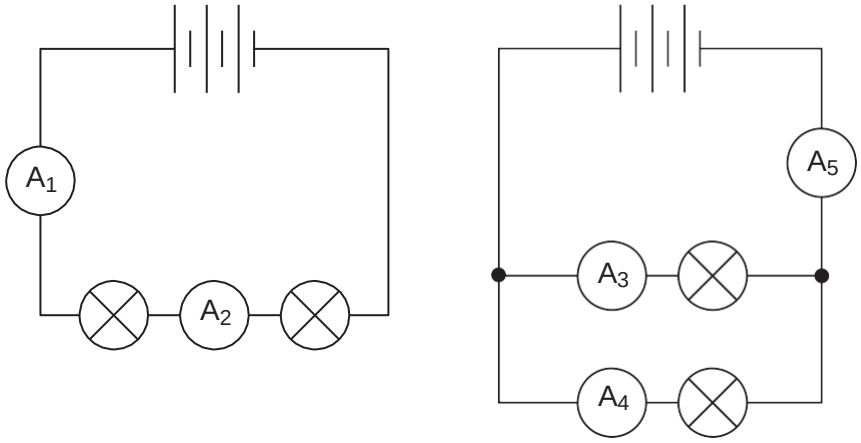
(d) Name two diseases or conditions that are hereditary by nature.

1. .....

2. .....

[2]

5 **(a)** A student set up two circuits using identical cells and bulbs.



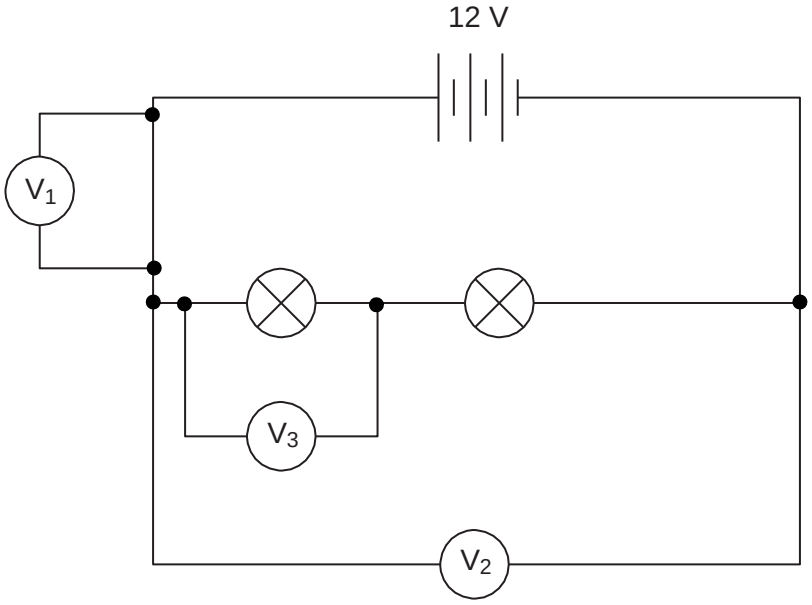
The readings were A_1 = 3 A, A_4 = 6 A and A_5 = 12 A.

What were the readings of the ammeters?

(i) A_2 =.....A [1]

(ii) A_3 =..... A [1]

(b) A circuit was set up using identical bulbs.



What were the readings of the voltmeters?

(i) V_1 =..... V [1]

(ii) V_2 =..... V [1]

(iii) V_3 =..... V [1]

6 The pH values of five substances are shown.

substance	pH
liquid detergent	13
colourless salt solution	7
stomach juice	1
toothpaste	9
vinegar	3

(a) Use the pH values to identify which of the five substances are acidic, alkaline, or neutral. Write your answers in the correct parts of the table.

acidic	alkaline	neutral

[3]

(b) State the colour of the salt solution after a few drops of universal indicator solution is added.

.....[1]

7 A circuit consists of the following components.

- One cell connected to two bulbs in parallel.
- An ammeter that reads the **total** current in the circuit.
- A switch able to turn off **one** bulb but not the other bulb.

In the box below, draw the circuit described.

[3]

8 In food production, what is used to

(a) regulate the growth and ripening of fruits?

.....[1]

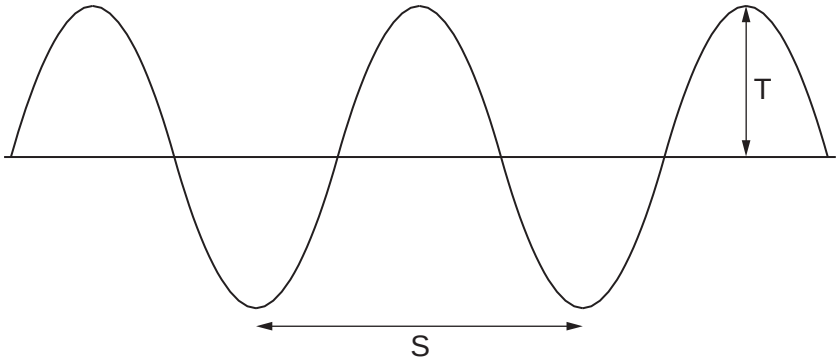
(b) protect crops against weeds?

.....[1]

(c) provide nutrients for faster plant growth?

.....[1]

9 The diagram shows a wave.



(a) State what the following letters represent.

(i) S .....[1]

(ii) T .....[1]

(b) State what is meant by the term *frequency*.

.....

.....[1]

10 In Experiment 1, a student investigated how temperature affected the rate at which an enzyme digested a protein.

The experiment was repeated (Experiment 2) but using double the concentration of the enzyme.

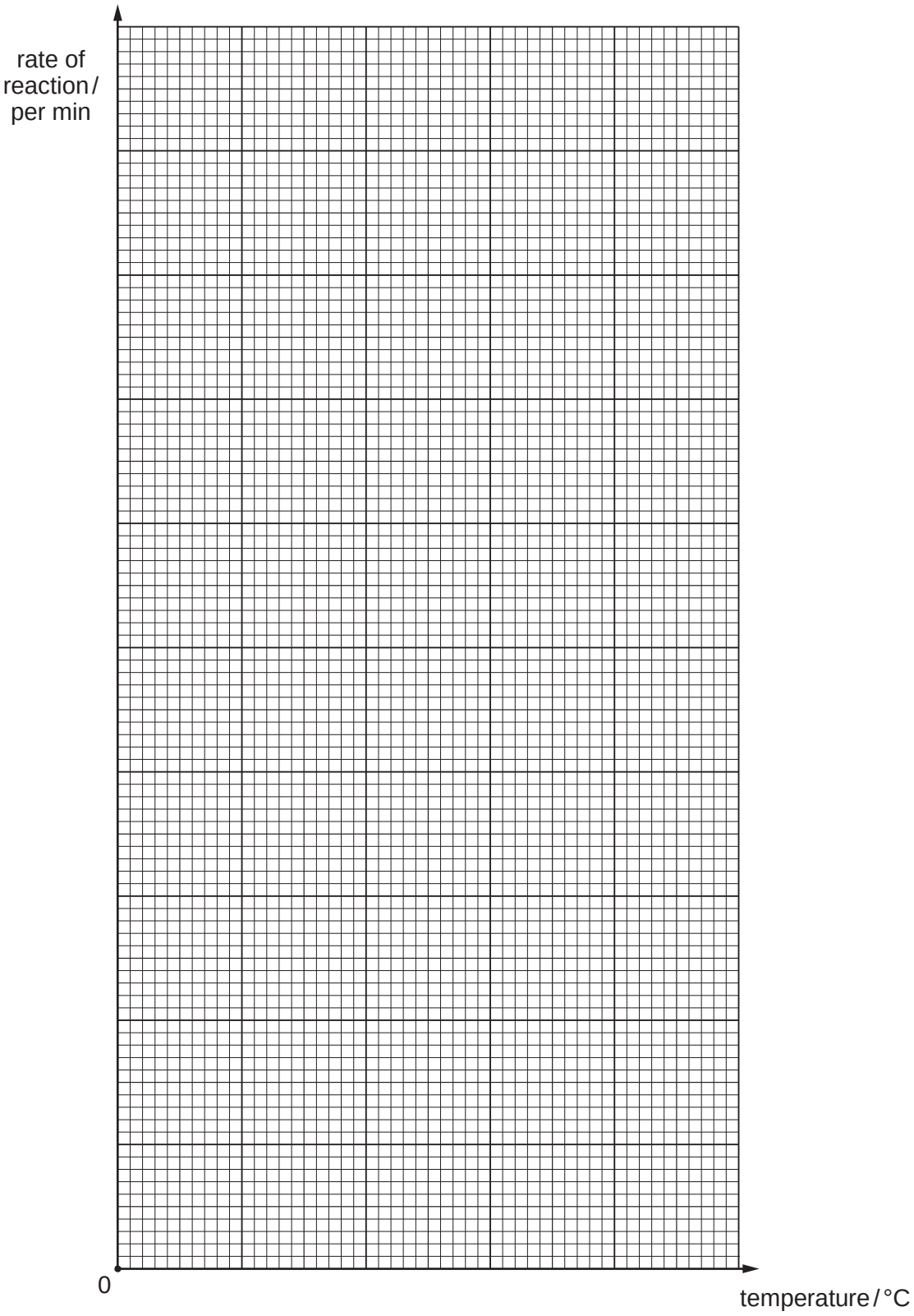
The results are shown below.

Temperature / °C	Experiment 1 Rate of reaction / per min	Experiment 2 Rate of reaction / per min
0	0	0
5	4	9
10	9	18
15	15	33
20	16	48
25	36	70
30	54	95
35	72	126
40	96	190
45	65	60

(a) Plot the results of Experiments 1 and 2.

Use smooth curves to connect the points for each experiment.

Label each curve as 1 or 2.



[5]

(b) From the graph of Experiment 1, state the temperature (NOT 45°C) at which the rate of reaction appears to be incorrect.

.....°C [1]

(c) Use the graphs to find the rate at 25°C for Experiment 2.

..... per min [1]

(d) Based on the graphs, what is the optimum temperature for the enzyme?

.....°C [1]

(e) Based on the graphs, state how doubling the enzyme concentration affects the rate of reaction.

.....[1]