



MINISTRY OF EDUCATION, SINGAPORE
 in collaboration with
 CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
 General Certificate of Education Normal (Academic) Level

CANDIDATE
 NAME

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CENTRE
 NUMBER

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INDEX
 NUMBER

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SCIENCE

5106/06

Paper 6 Biology

For examination from 2024

SPECIMEN PAPER

Papers 5 and 6: 1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.



READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

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

DO NOT WRITE ON ANY BARCODES.

Section A

Answer **all** questions.

Write your answers in the spaces provided.

Section B

Answer **one** question.

Write your answers in the spaces provided.

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

In calculations, you should show all the steps in your working, giving your answer at each stage.

You are advised to spend no longer than 30 minutes on Paper 5.

You may proceed to answer Paper 6 as soon as you have completed Paper 5.

At the end of the examination hand in your answers to Paper 5 and Paper 6 separately.

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

This document consists of **11** printed pages and **1** blank page.



Singapore Examinations and Assessment Board



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Section A

Answer **all** questions.

- 1 A scientist adds red blood cells to three sugar solutions of different concentrations, solution A, solution B and solution C.

Fig. 1.1 shows the observations after 5 minutes.

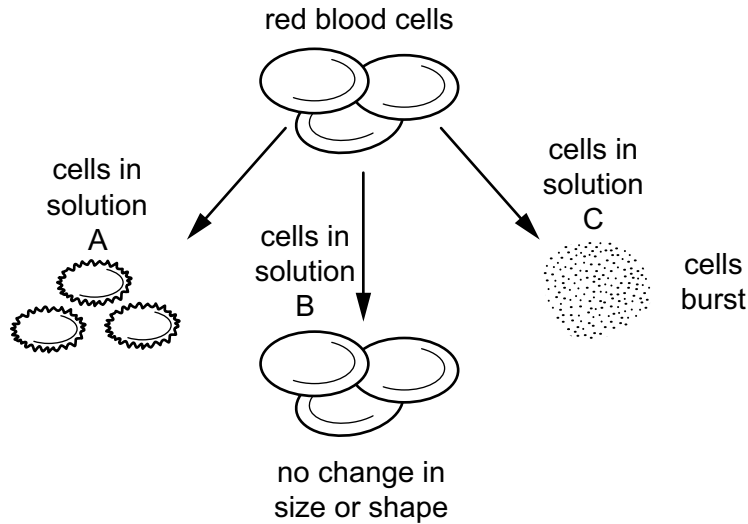


Fig. 1.1

- (a) (i) Describe how the red blood cells change when added to solution A.

.....
..... [1]

- (ii) Explain why this change happens.

.....
.....
..... [2]

- (b) (i) Which sugar solution has the same water potential as the red blood cells?

..... [1]

- (ii) Explain your answer to (b)(i) in terms of the movement of water molecules.

.....
..... [1]

- 2 In a country, it is against the law to drive a vehicle when the amount of alcohol in the blood is more than 80 mg per 100 cm³ of blood.

Fig. 2.1 shows the concentration of alcohol in a person's blood for 6 hours after starting to drink alcohol.

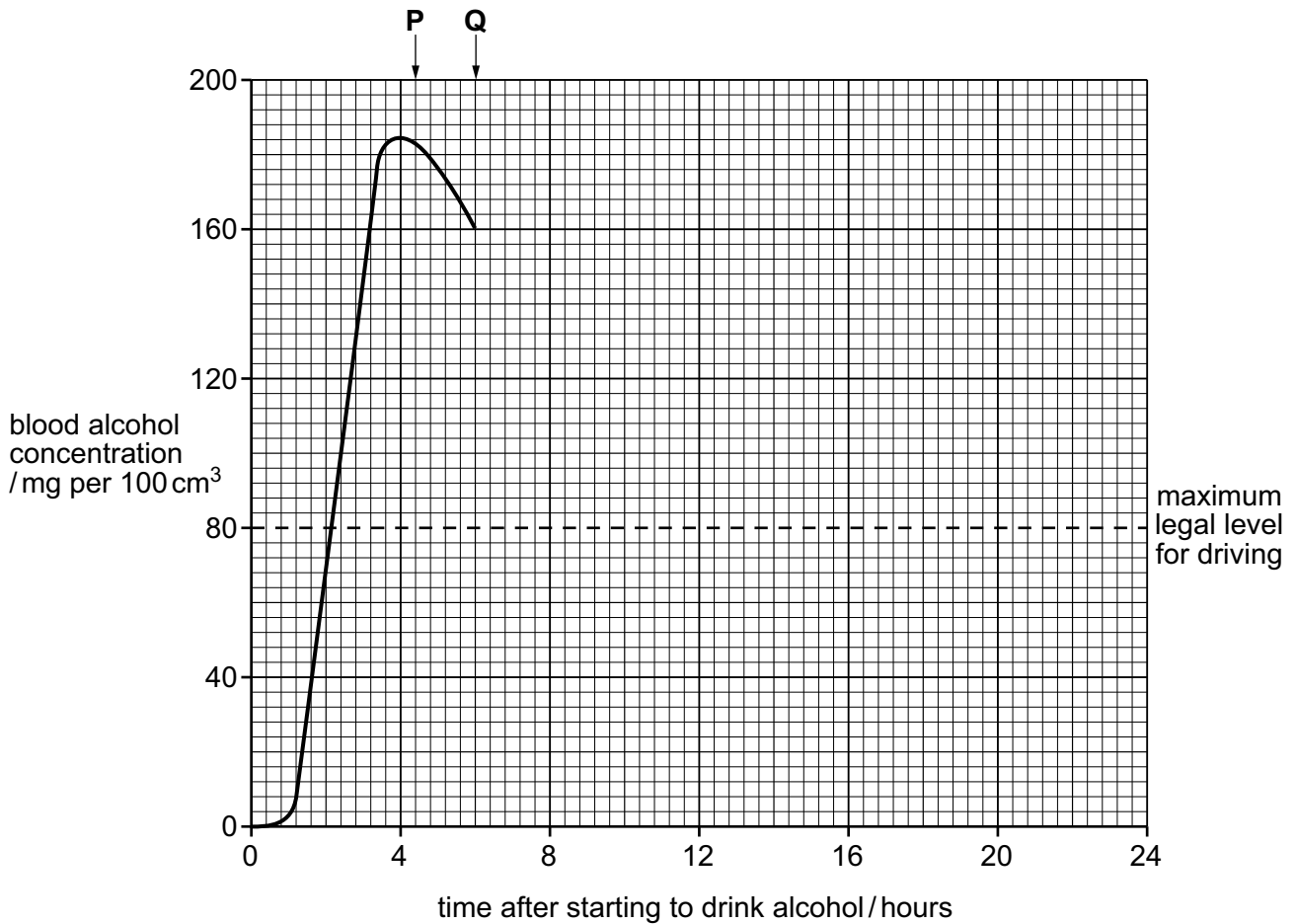
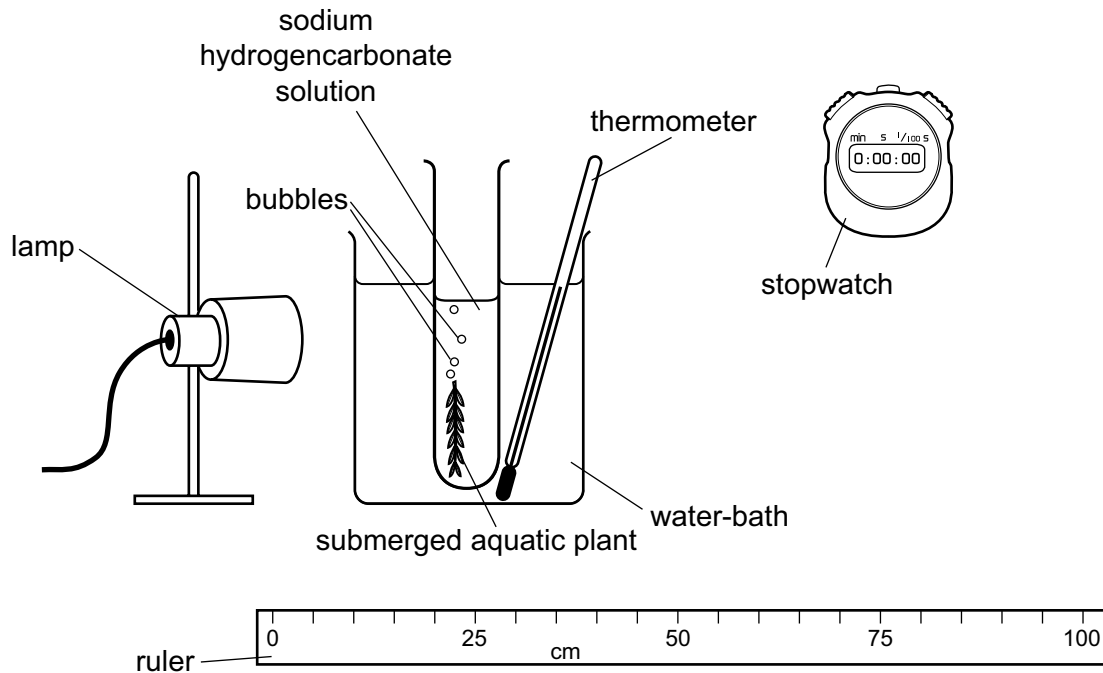


Fig. 2.1

- (a) Use the graph to determine the highest concentration of alcohol in the person's blood.
 concentration of alcohol mg per 100 cm³ [1]
- (b) Name the organ in the body that breaks down alcohol.
 [1]
- (c) The alcohol continues to be broken down at the same rate as between P and Q.
 Complete the graph by extending the line, until there is no alcohol in the person's blood. [1]
- (d) Use the graph to predict when it would be legal for the person to drive again.
 [1]

- 3 The apparatus in Fig. 3.1 is used to investigate how light intensity affects the rate of photosynthesis for a submerged aquatic plant.



not drawn to scale

Fig. 3.1

The sodium hydrogencarbonate solution releases carbon dioxide. The only light source is the lamp.

- (a) Carbon dioxide is a reactant required for photosynthesis.

Name the other reactant required for photosynthesis.

..... [1]

- (b) Suggest why the test-tube containing the aquatic plant was placed in a water-bath.

..... [1]

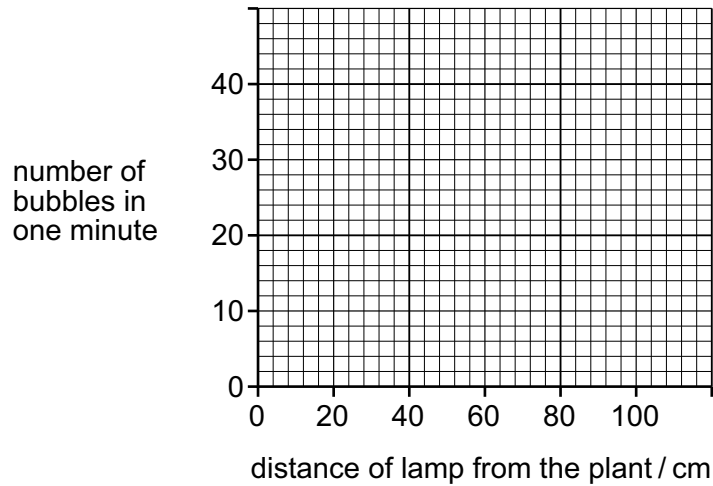
(c) The light intensity is changed by moving the lamp away from the plant.

The results are shown in Table 3.1.

Table 3.1

distance of lamp from the plant/cm	number of bubbles in one minute
20	40
40	20
60	10
80	5
100	2

(i) Complete the graph using the data in Table 3.1 and draw a line of best fit.



[2]

(ii) Describe the relationship, shown by the data, between the distance of the lamp from the plant and the number of bubbles produced in one minute.

.....
 [1]

4 Infectious diseases can be spread from person to person.

(a) Antibiotics are sometimes used to treat an infection caused by a pathogen.

(i) State the type of pathogen that antibiotics are used to kill.

..... [1]

(ii) Many antibiotics have been developed. Some of these antibiotics are not used anymore because of the emergence of antibiotic resistant pathogens.

Table 4.1 gives information about three of these antibiotics, R, S and T.

Table 4.1

antibiotic	year antibiotic was developed	year antibiotic resistant pathogens were first observed
R	1962	1973
S	2000	2003
T	2004	2005

Use the data in the table to compare the antibiotics.

.....

 [2]

(iii) State **one** cause of antibiotic resistance.

..... [1]

(b) Vaccines are used to prevent infectious diseases.

(i) Explain how vaccines prevent infectious diseases.

.....

 [2]

(ii) A vaccine was introduced into a small country in 1968 to prevent measles, an infectious disease. The graph in Fig. 4.1 shows the effect of introducing this vaccine.

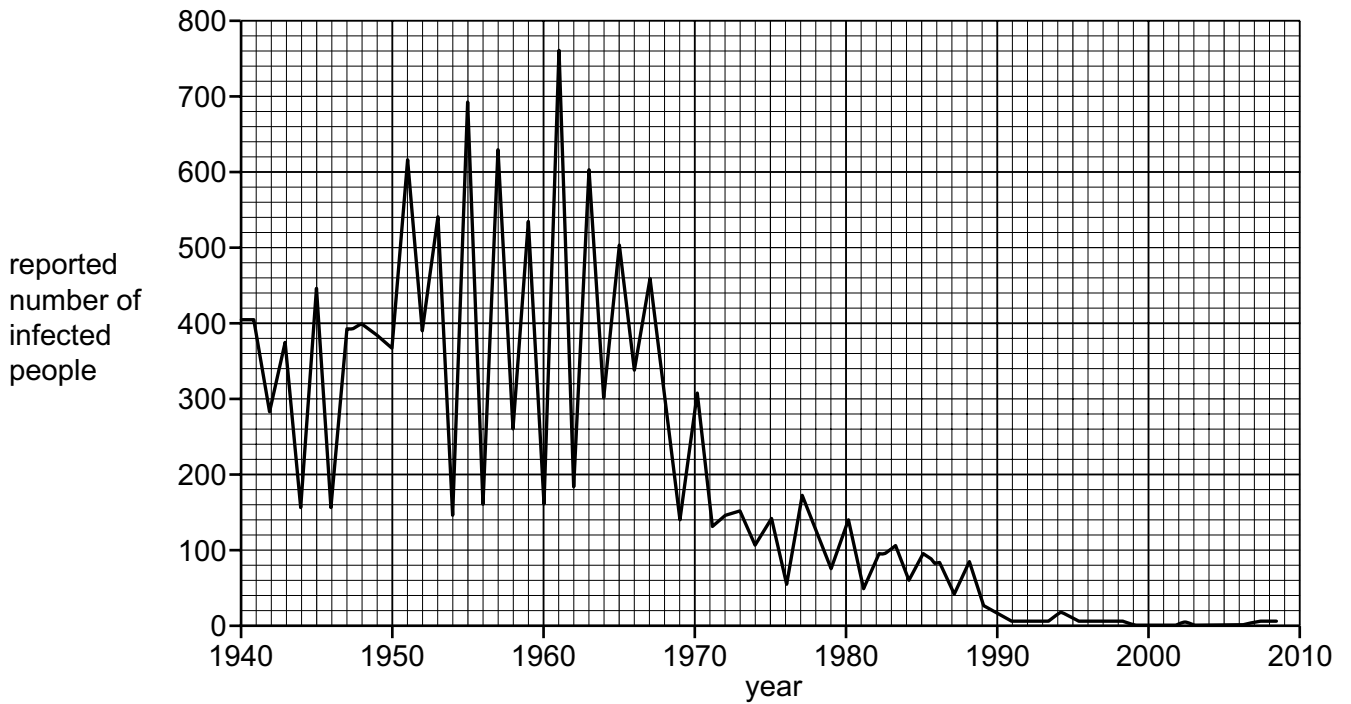


Fig. 4.1

Explain what this data shows about the effect of introducing this vaccine and suggest a possible source of error in this data.

explanation

 source of error

[2]

Section B

Answer **one** question from this section.

5 Fig. 5.1 represents the route taken by blood around the body.

J, K, L and M are blood vessels.

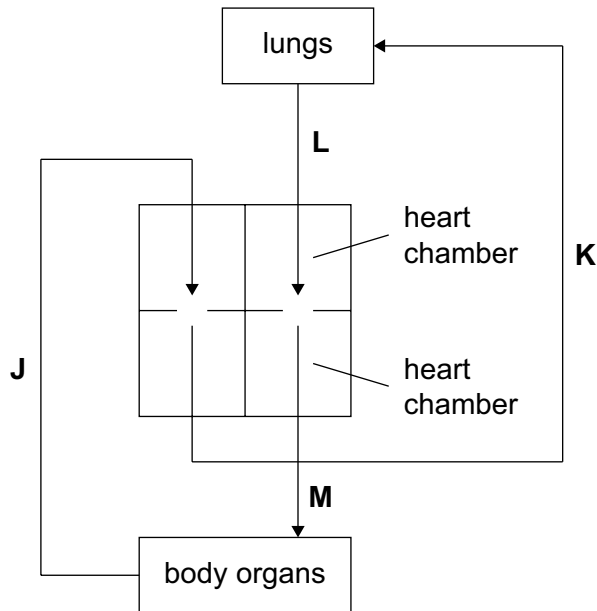


Fig. 5.1

(a) There are different types of blood vessels.

Identify the type of blood vessel J.
Give a reason for your answer.

type of blood vessel

reason

.....

[2]

(b) (i) Name blood vessel K.

..... [1]

(ii) State **one** difference between the structure of blood vessel K and the structure of blood vessel J.

.....

..... [1]

(c) (i) State and explain **two** differences between the carbon dioxide and oxygen concentrations in the blood flowing in blood vessel J and blood vessel L.

1

.....

2

.....

[2]

(ii) Suggest and explain which of the four blood vessels contains blood at the highest pressure.

.....

.....

..... [2]

6 The duodenum is labelled on Fig. 6.1 which shows part of the human digestive system.

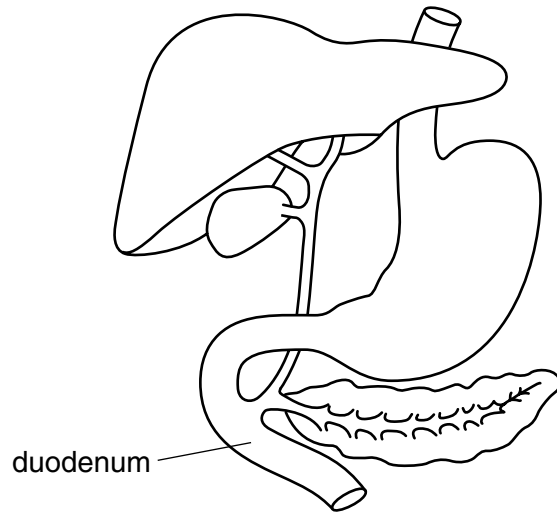


Fig. 6.1

- (a) (i) On Fig. 6.1 label the gall bladder, the oesophagus and the pancreas. [2]
- (ii) Describe the function of the gall bladder.

.....

..... [1]

(b) The graph in Fig. 6.2 shows the activity of three digestive enzymes in solutions of different pH.

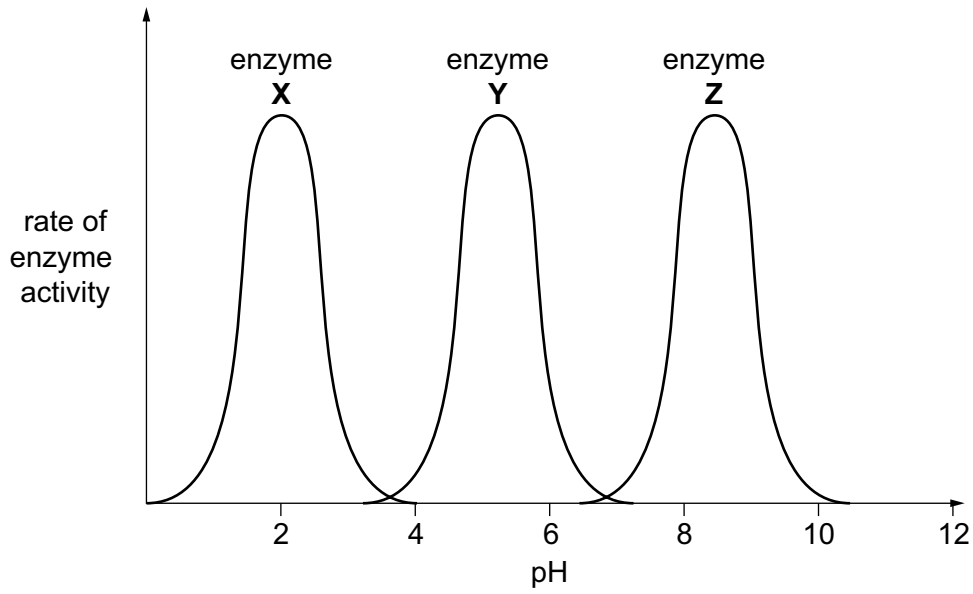


Fig. 6.2

(i) Identify and explain which one of the three enzymes, X, Y or Z, is most likely to be active in the stomach.

.....
.....
..... [2]

(ii) Each enzyme has a similarly shaped graph.

Use ideas of the 'lock and key' hypothesis to explain why the graphs have this shape.

.....
.....
.....
..... [3]

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