

Class	Register Number	Name
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南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL

End-of-Year Examination 2017
Secondary Three

BIOLOGY

Paper 2 Theory Paper

Monday

2 October 2017

1 hour 45 minutes

1045 - 1230

Additional materials: 3 writing papers and 1 graph paper

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, register number and class in the spaces at the top of this page and on any separate answer paper used.

Write in dark blue or black pen on both sides of the paper.

Do not use staples, paper clips, highlighters or correction tape.

Section A (40 marks)

Answer **all** questions.

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

Section B (30 marks)

Answer **all** questions including questions **6, 7** and **8 Either** or **8 Or**.

Write your answers on the separate writing paper provided.

At the end of the examination,

1. fasten all your work securely together;
2. tick **8 Either** (for *Either*) or **8 Or** (for *Or*) next to the question number 8 in the grid below to indicate which question you have answered.

INFORMATION FOR CANDIDATES

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.

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

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

Examiner's Use	
Paper 1 (30 marks)	
Section A (40 marks)	
1 (8 marks)	
2 (5 marks)	
3 (9 marks)	
4 (8 marks)	
5 (10 marks)	
Section B (30 marks)	
6 (10 marks)	
7 (10 marks)	
8 Either (10 marks)	
8 Or (10 marks)	
Total (100 marks)	

This document consists of **11** printed pages.

Setters: OChee & LSM

NANYANG GIRLS' HIGH SCHOOL

[Turn over

Section A

Answer **all** questions.

1 Fig. 1.1 shows a pair of cells.

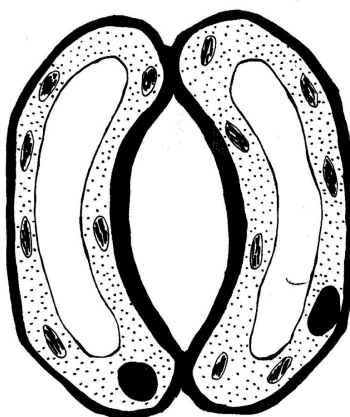


Fig. 1.1

(a) (i) Name the cells.

[1]

(ii) Describe one function of the cells.

[1]

(b) (i) The cells are adapted to perform their function(s). Label two such adaptations on Fig. 1.1.

[2]

(ii) Explain how the adaptations in **(b)(i)** help the cells in performing their functions.

[4]

[Total: 8]

2 Fig. 2.1 shows a dipeptide.

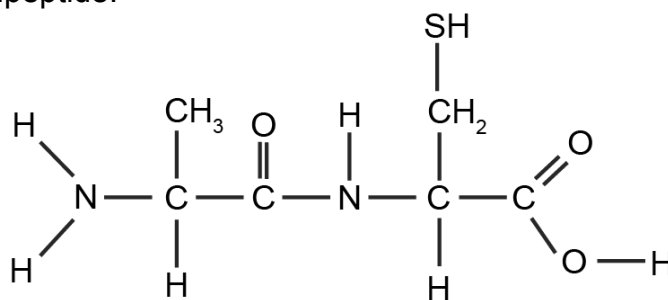


Fig. 2.1

- (a) (i) On Fig. 2.1, circle and label the amino group, and the acidic group. [1]
- (ii) State the enzyme required to catalyse the digestion of the dipeptide into amino acids. [1]
- (iii) State a biological consequence if a person fails to produce the enzyme in (a)(ii). [1]
- (b) The dipeptide in Fig. 2.1 was digested into amino acids. Draw the products of this digestion in the space below.

[2]

[Total: 5]

3 Fig. 3.1 shows a potometer.

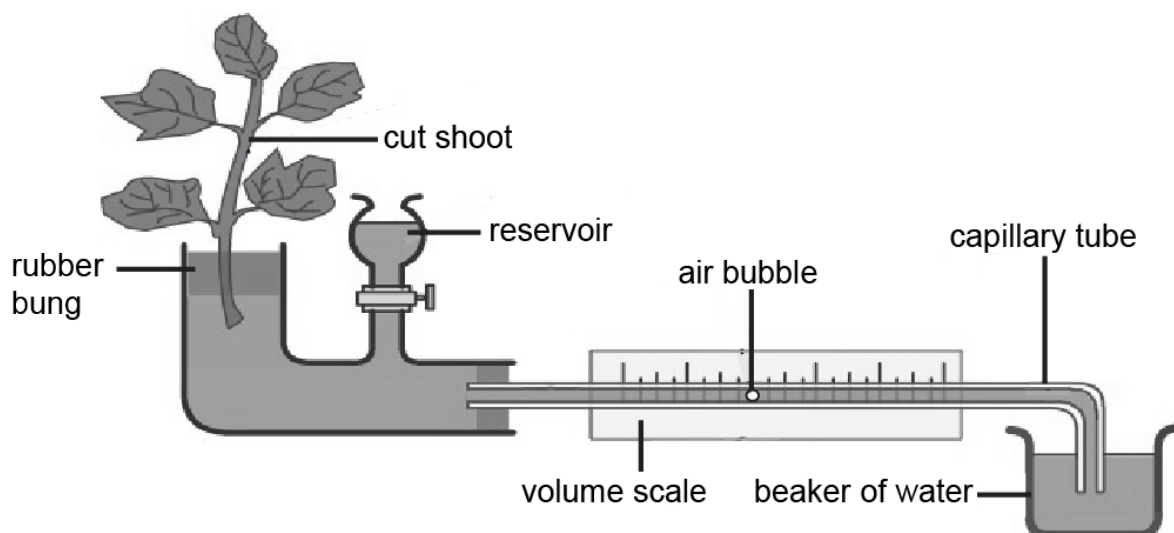


Fig. 3.1

- (a) Table 3.1 shows the readings taken from a potometer, which was set up as in Fig. 3.1. The air bubble was not reset to zero after each set of readings were taken.

Table 3.1

time / min	marking of bubble showing volume / ml		
	trial 1	trial 2	trial 3
0	0.1	1.3	2.6
30	1.3	2.6	3.7

Calculate the mean transpiration rate of the plant in ml / min. Show your working clearly.

[2]

- (b) State **two** assumptions made when using the potometer to measure the rate of transpiration.

[2]

- (c) An experiment to investigate the effect of temperature on the rate of transpiration was set up as shown in Fig. 3.2.

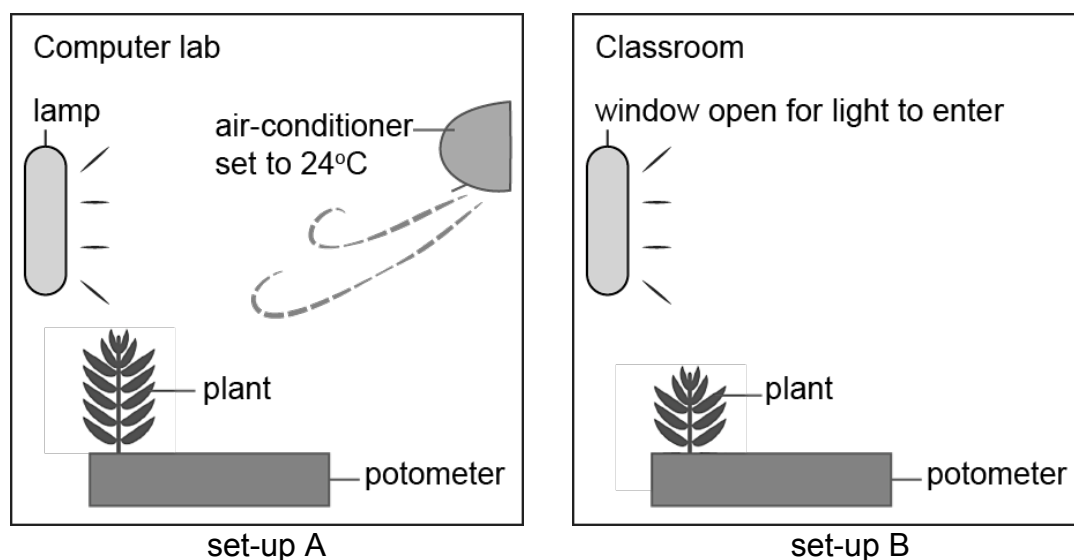


Fig. 3.2

The results of the experiment are shown in Table 3.2.

Table 3.2

set-up	transpiration rate/ arbitrary units
	2
	8

- (i) Fill in Table 3.2 to indicate which set-up gave which results. [1]

- (ii) Explain your answer in (c)(i).

[2]

- (iii) State two inconsistencies in the experimental design.

[2]

[Total: 9]

- 4 Fig. 4.1 shows a bar chart illustrating the relative distribution of tissues across the three main types of blood vessels in the human body.

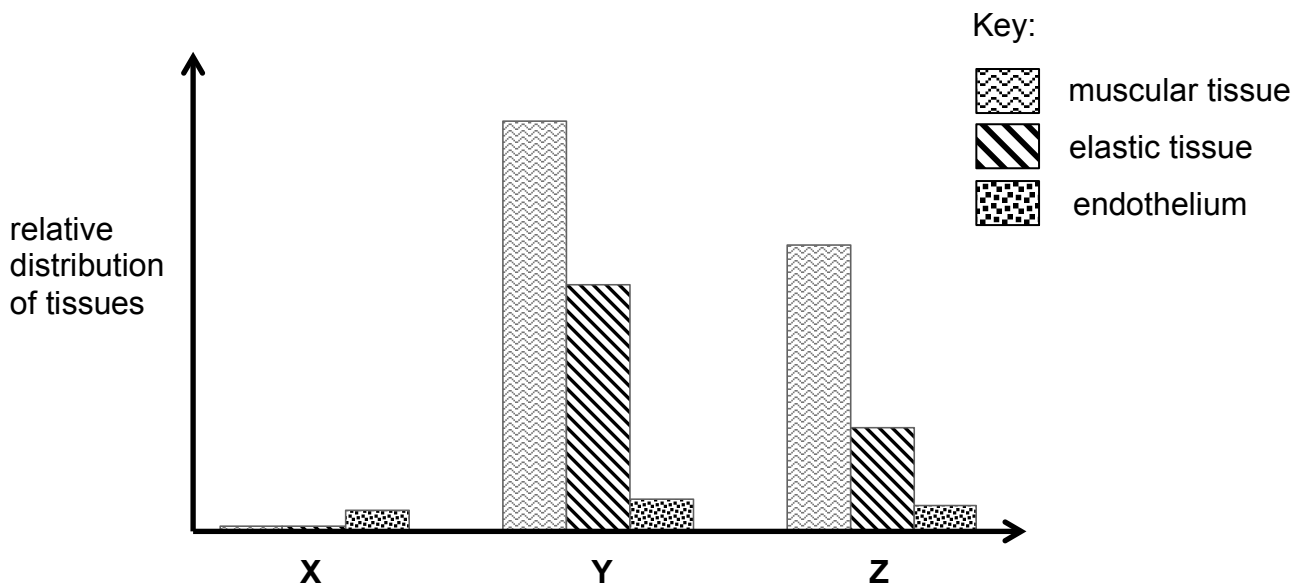


Fig. 4.1

- (a) State **two** differences in the relative distribution of tissues in the walls of blood vessels X, Y and Z?

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[2]

- (b) Based on the differences in relative distribution of tissues stated in part (a), predict **two** differences in the roles of blood vessels X, Y and Z?

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[2]

- (c) Fig. 4.2 shows the changes in pressure in the left side of a human's heart during a normal cardiac cycle.

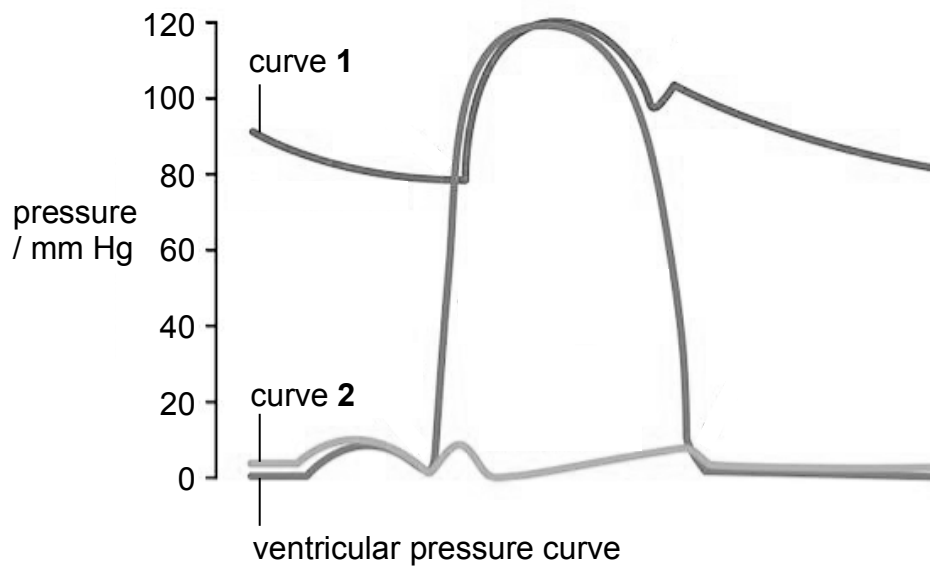


Fig. 4.2

- (i) Which curve, 1 or 2, in Fig. 4.2 corresponds to the pressure in blood vessel Y? Explain your answer.

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..... [1]

- (ii) With reference to Fig. 4.2, predict how the ventricular pressure curve will differ for the right ventricle. Explain your prediction.

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..... [3]

[Total: 8]

- 5** An experiment was conducted to investigate the rate of breathing of a person performing various activities. During each activity, the volume of air taken in at each breath and number of breaths per minute were measured and recorded. The results are shown in Table 5.1.

Table 5.1

type of activity	volume of air per breath / cm ³	number of breaths per minute	volume of air breathed in per minute
running	1000	40	
walking	700	28	
standing	550	22	
sleeping	500	20	

- (a)** Calculate the volume of air breathed in per minute for each activity and complete Table 5.1. [2]

- (b)** Explain the change in volume of air breathed in per minute when the person switches from walking to running.

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[2]

- (c)** Assuming that the person has achieved his maximum breathing rate shown in Table 5.1, describe and explain the consequences he might experience if he continues running.

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[3]

- (d)** Inhalation and exhalation are processes that result in air flowing into and out of the lungs respectively. State three differences between inhalation and exhalation.

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[3]

[Total: 10]

Section B

Answer **three** questions on the separate writing paper provided.

The last question is in the form of either/or and only **one** of the alternatives should be attempted.

Each question carries **ten** marks.

- 6** **(a)** Describe, with specific examples, how protein transporters are used in life processes in plants and animals. [3]
- (b)** Six test tubes were set up at different pH values. Each test tube contained the same quantity of starch and amylase in water.
Table 7.1 shows the time taken for the reaction to be completed in each test-tube.

Table 7.1

pH	1	3	5	7	9	11
time taken for reaction to be completed/s	95	64	42	5	35	66

- (i)** On a sheet of graph paper, plot a graph from the data given in Table 7.1. [4]
- (ii)** Describe and explain the shape of the graph. [2]
- (iii)** Using the graph, determine the time taken for the reaction to be completed at pH 6. Show clearly how you obtained your answer. [1]

[Total: 10]

- 7** **(a)** "A person with blood type O can only receive blood transfusion from a donor with the same blood type."
Comment on the validity of the statement. [2]
- (b)** Some babies are born with a "hole in the heart". As a result, less oxygen is supplied to the body and affected children tend to be bluish and cannot tolerate physical exertion.
- (i)** Where is this "hole" likely to be in the heart? [1]
- (ii)** How does this condition lead to oxygen deficiency? [3]
- (c)** Outline the process of blood clotting when a blood vessel is damaged. [4]

[Total: 10]

Either

- 8 (a)** Most absorption of nutrients occurs in region **X** of the small intestine.
- (i) Identify region **X**. [1]
- (ii) Explain how region **X** is adapted for the absorption of nutrients. [5]
- (b)** In a patient with cystic fibrosis, his pancreatic duct is blocked by thick mucus. Suggest and explain an effect of a blocked pancreatic duct on his health. [4]
- [Total: 10]

Or

- 8 (a)** Describe the process of photosynthesis. [6]
- (b)** The same features of the leaf, which help it to photosynthesise efficiently, also facilitate a high rate of water loss through transpiration. Explain. [4]
- [Total: 10]

End of paper