



**Geylang Methodist School (Secondary)**  
**End of Year Examination 2016**

**BIOLOGY**

Paper 1

**5158/01**  
**3 Express**

**Additional materials:** Optical Answer Sheet

**45 minutes**

**Setter :** Mrs Gan Huey Shin

**13 Oct 2016**

**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.  
Do not use staples, papers clips, highlighters, glue or correction fluid on the Optical Answer Sheet.

Write your name, class and index number on the Optical Answer Sheet provided.

There are **thirty** questions in this paper. Answer **all** the 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 separate answer sheet.

**Read the instructions on the answer sheet very carefully.**

Each correct answer will score one mark. No mark will be deducted for a wrong answer.

Any rough working should be done in this booklet.

This document consists of 14 printed pages.

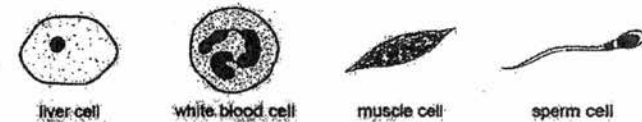
[Turn over

- 1 Pancreatic tissue from a freshly killed rat was removed, placed in warm isotonic saline solution and radioactively labelled amino acids were added. At intervals after adding the amino acids, samples of the tissue were removed, sections cut and the sites of radioactivity determined.

Which of the following represents the order in which radioactivity appeared in the organelles?

	first	second	third	last
<b>A</b>	Golgi body	smooth endoplasmic reticulum	rough endoplasmic reticulum	secretory vesicles
<b>B</b>	Golgi body	rough endoplasmic reticulum	smooth endoplasmic reticulum	secretory vesicles
<b>C</b>	rough endoplasmic reticulum	smooth endoplasmic reticulum	Golgi body	secretory vesicles
<b>D</b>	smooth endoplasmic reticulum	rough endoplasmic reticulum	secretory vesicles	Golgi body

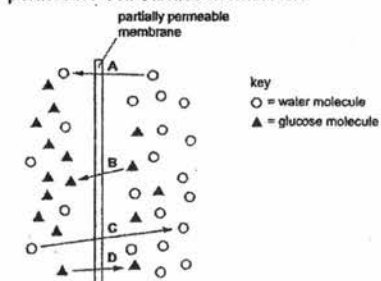
- 2 The diagram shows four specialised cells.



Which feature is **not** common to all of these cells?

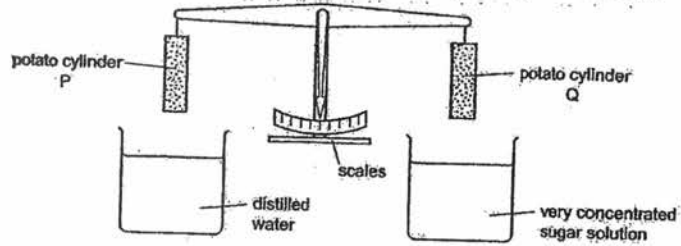
- A** cell membrane                      **C** chromosomes  
**B** cytoplasm                              **D** nucleus

- 3 The diagram represents the passage of water molecules and glucose molecules across a partially permeable cell surface membrane.



Which arrow indicates diffusion?

- 4 A student investigated osmosis in potatoes. He set up the apparatus shown.



At the beginning the potato cylinders were exactly balanced. He immersed the cylinders into the liquids for 4 hours, after which the cylinders were lifted out of the liquids. Cylinder P was now heavier than cylinder Q.

Which statement explains what happened?

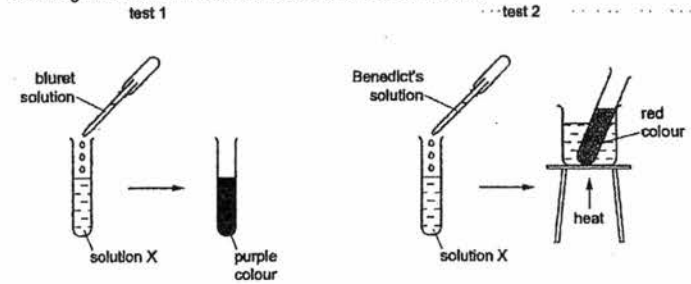
- A Water moved into both cylinders.  
 B Water moved out of both cylinders.  
 C Water moved into the cylinder in the distilled water and out of the cylinder in the sugar solution.  
 D Water moved out of the cylinder in the distilled water and into the cylinder in the sugar solution.
- 5 The table below shows the rate at which two sugars are absorbed into the lining of a healthy small intestine and for an intestine which has been subjected to a respiratory poison.

type of sugar	rate of absorption (arbitrary units)	
	healthy intestine	poisoned intestine
glucose	120	43
maltose	39	39

From the data, how do the two sugars enter the intestinal lining when the intestine is poisoned?

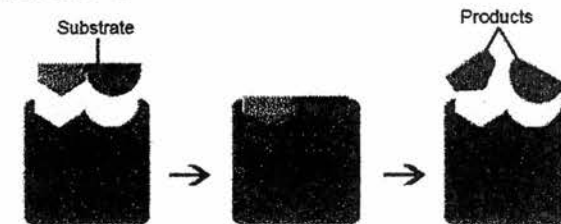
	glucose	maltose
A	active transport	diffusion
B	diffusion	diffusion
C	diffusion	osmosis
D	active transport	active transport

- 6 The diagram shows two food tests carried out on solution X.



Which nutrients are present in solution X?

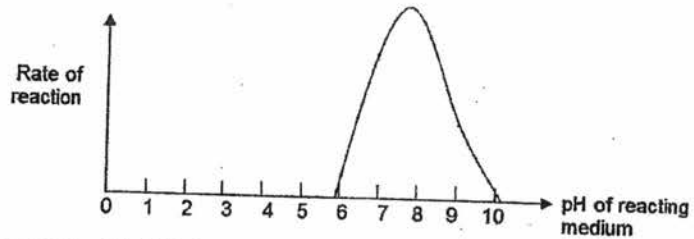
- A protein and starch  
 B protein and reducing sugar  
 C fat and sugar  
 D starch and reducing sugar
- 7 Which of the following below correctly describes water?
- I. It plays a role in digestion.  
 II. It is a product of respiration in cells.  
 III. It is a solvent for digested food in blood plasma.
- A II only  
 B II and III  
 C I and III  
 D I, II and III
- 8 The following diagram illustrates an enzyme-controlled reaction. The reaction takes place at 37 °C.



Which one of the following conclusions can be made from the diagram?

- A Enzymes are made up of proteins.  
 B Enzymes are affected by temperature.  
 C Enzymes remain unchanged at the end of all enzymatic reactions.  
 D The shape of the substrate must be the same as the enzyme.

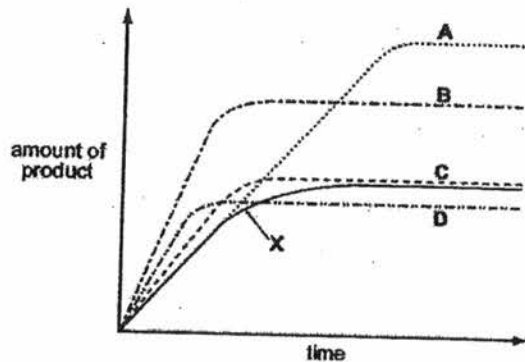
9 The graph below shows the effect on an enzyme-controlled reaction by varying the pH of the reacting medium.



For which of the following groups of mammalian gut enzymes would this graph be appropriate?

- A amylase, trypsin, lipase
- B peptidase, rennin, amylase
- C lipase, peptidase, pepsin
- D pepsin, amylase, trypsin

10 The curve X shows the activity of an enzyme at 20°C. Curve A, B, C and D show the effect of different conditions on the activity of the enzyme.



Which curve shows the effect of increasing the temperature by 10°C while keep other conditions the same?

11 The table shows nutrients present in four foods.

food	carbohydrate	fat	protein
P	✓	×	✓
Q	×	×	✓
R	×	✓	×
S	✓	✓	×

Key  
 ✓ = present  
 × = absent

Which foods would both be partly digested in the stomach?

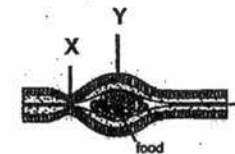
- A P and Q
- B P and R
- C Q and S
- D R and S

12 A universal indicator is red when neutral, yellow when acidic and purple when alkaline.

Which of the following correctly matches the change in indicator to the products of each type of digestion?

	type of digestion	colour of indicator
A	action of peptidase on polypeptides	yellow
B	action of lipase on fats	red
C	action of pepsin on proteins	yellow
D	action of trypsin on polypeptides	purple

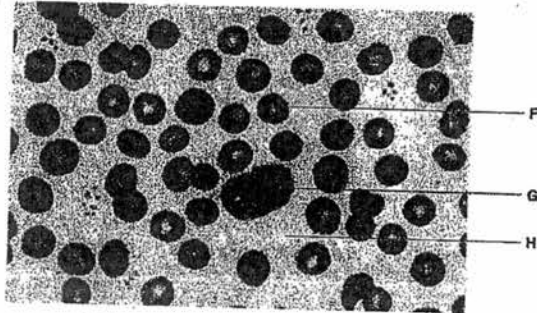
13 The diagram below shows the peristaltic movement along the oesophagus.



Which best describes the action of muscles in the wall of the oesophagus when a bolus of food is pushed down the alimentary canal?

	circular muscles at X	longitudinal muscles at Y
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

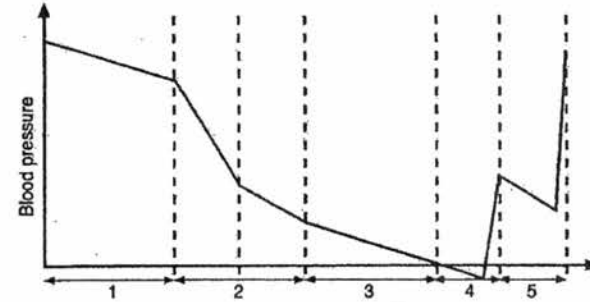
- 14 Which of the following is **not** a function of the liver?
- A breakdown of haemoglobin
  - B metabolism of amino acids
  - C neutralize toxic substances
  - D production of digestive enzymes
- 15 Which one of the following would **not** be a likely outcome of the removal of the pancreas?
- A decrease in the amount of glycogen production in liver and muscle cells
  - B decrease in the amount of protein digested
  - C diabetes mellitus
  - D increase in the pH of duodenum
- 16 The diagram below shows the components of blood as seen through a light microscope.



Which row correctly identifies the functions of F, G and H?

	F	G	H
A	blood clotting	tissue rejection	transport of blood cells
B	carry haemoglobin	produce fibrinogen	transport of carbon dioxide
C	oxygen transport	phagocytosis	transport of blood cells
D	transport of carbon dioxide	phagocytosis	transport of hormones

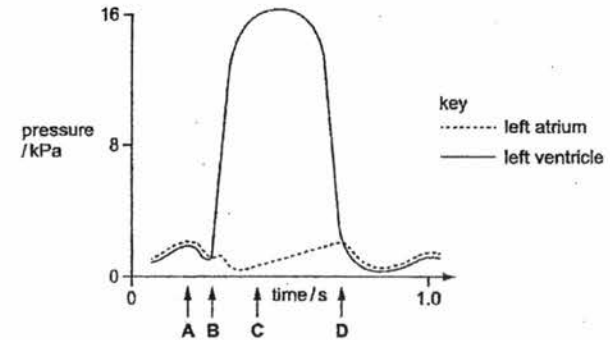
- 17 The graph below shows the blood pressure in various blood vessels in the human circulatory system.



Which of the following correctly identifies the blood vessels?

	1	2	3	4	5
A	arteries	capillaries	veins	vena cava	pulmonary artery
B	arteries	pulmonary artery	capillaries	veins	vena cava
C	arteries	pulmonary artery	vena cava	capillaries	veins
D	arteries	vena cava	pulmonary artery	veins	capillaries

- 18 The graph shows the pressure changes in the left atrium and the left ventricle while the heart is beating.

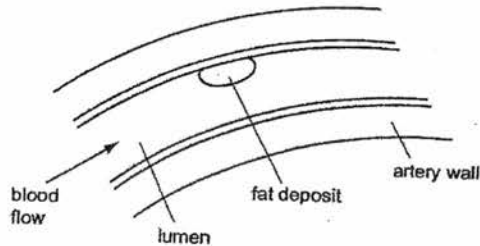


When does the atrio-ventricular (bicuspid) valve start to open?

19 What causes the sounds 'lub' and 'dub' in the human heart?

	'lub'	'dub'
A	Closure of tricuspid valve	Closure of bicuspid valve
B	Closure of bicuspid valve	Closure of tricuspid valve
C	Closure of bicuspid and tricuspid valves	Closure of semi-lunar valves
D	Closure of semi-lunar valves	Closure of bicuspid and tricuspid valves

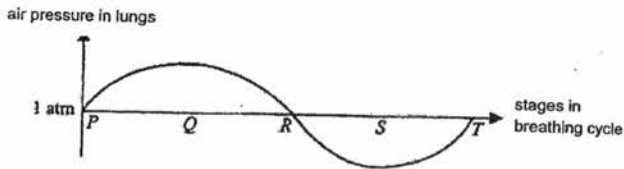
20 The following diagram shows a section of the coronary artery with deposition of fats that may result in a heart attack.



What best describes the events that could lead to a heart attack?

- A Hardening the artery wall preventing diffusion across the wall.
- B Further fat deposits followed by platelet destruction.
- C Further fat deposits followed by red blood cell destruction.
- D Restriction of the artery's lumen causing less oxygen supply.

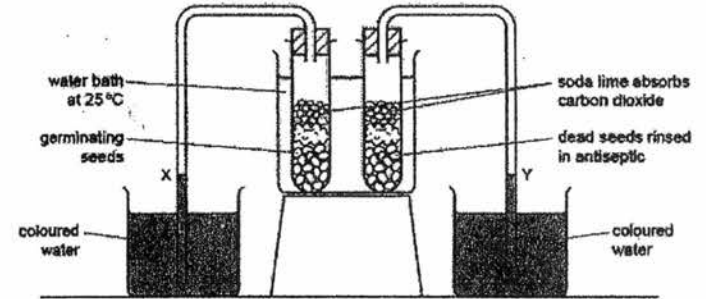
21 The diagram below shows the changes in air pressure in the lungs during a breathing cycle.



Which of the following phases represents inhalation?

- A PR
- B PT
- C QS
- D RT

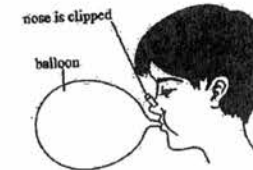
22 An experiment is set up to investigate the uptake of oxygen by germinating seeds.



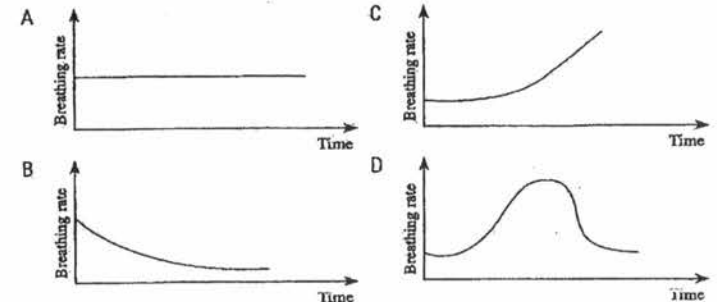
What happens to the levels at X and Y?

	X	Y
A	falls	rises
B	falls	unchanged
C	rises	falls
D	rises	unchanged

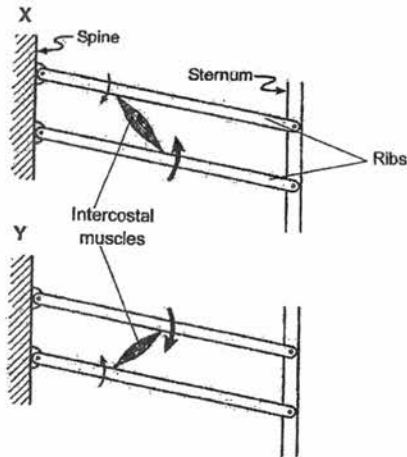
23 The diagram shows a boy who is breathing in and out of a balloon with his nose clipped.



Which of the following graphs accurately describes the change in breathing rate experienced by the boy throughout the experiment?



24 Panels X and Y show a model of the intercostal muscles at the rib cage:



The two bars oriented obliquely in each panel represent two adjacent ribs. The external and internal intercostal muscles are depicted as single bundles, and the moments acting on the ribs during contraction of these muscles are represented by arrows.

When the external intercostal contracts, the moment acting on the lower rib is greater than that acting on the upper rib; the opposite is true when the internal intercostal contracts.

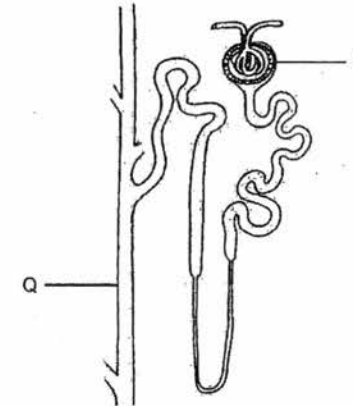
Which row correctly identifies the muscles represented in panels X and Y, and the breathing process activated when the muscle is contracting?

	muscle represented at panel X	breathing process activated when muscle in X contracts	muscle represented at panel Y	breathing process activated when muscle in Y contracts
A	external intercostal	inhalation	internal intercostal	exhalation
B	external intercostal	exhalation	internal intercostal	inhalation
C	internal intercostal	inhalation	external intercostal	exhalation
D	internal intercostal	exhalation	external intercostal	inhalation

25 What is the effect of cigarette smoke on the bronchi?

	cilia	gland cells
A	beat faster	release more mucus
B	beat faster	release less mucus
C	beat slower	release more mucus
D	beat slower	release less mucus

26 The diagram below shows the simplified structure of a kidney nephron.



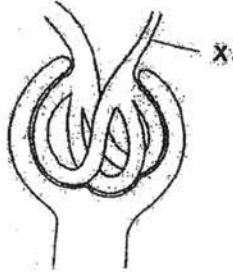
The table shows the quantities of three substances 1, 2 and 3 as they pass from bloodstream into part P and from part Q into bloodstream.

substance	quantity passing into P (g)	quantity passing from Q (g)
1	180	1.5
2	60	55
3	200	0

Based on the data given in the table, what are the identities of substances 1, 2 and 3?

	substance 1	substance 2	substance 3
A	water	sodium ion	urea
B	water	urea	glucose
C	glucose	urea	water
D	amino acids	water	glucose

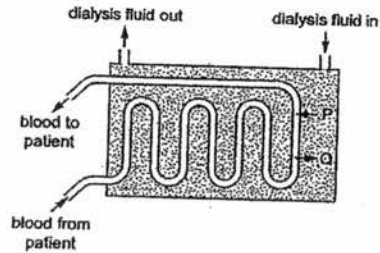
- 27 The diagram below shows a glomerulus and Bowman's capsule of a mammalian nephron.



What happens if the diameter of the blood vessel in enlarged at X?

- A More sodium will appear in the urine.  
 B Less glucose will appear in the urine.  
 C Water reabsorption will decrease.  
 D The rate of urine production will be reduced.

- 28 The diagram shows a dialysis machine.



In a person whose health problems affect only the kidneys, which substances will move as shown at P and Q?

	P	Q
A	amino acids	protein
B	glucose	urea
C	salts	fat
D	urea	protein

- 29 Drinks that contain caffeine inhibit the production of anti-diuretic hormone (ADH).

Which row shows the results of these drinks on the kidney tubule and the urine produced?

	amount of water reabsorbed by kidney tubule	effect on urine produced	
		quantity	concentration
A	decreased	decreased	concentrated
B	decreased	increased	diluted
C	increased	decreased	concentrated
D	increased	increased	diluted

- 30 Blood samples from three veins (X, Y and Z) of a healthy person were taken and the concentrations of carbon dioxide, oxygen and urea were measured. The results, in arbitrary units, are shown in the following table.

vein	carbon dioxide concentration / arbitrary units	oxygen concentration / arbitrary units	urea concentration / arbitrary units
X	45	34	0.3
Y	48	37	6.8
Z	33	98	5.1

Another individual suffers from some illness. His blood samples from the same type of veins (X, Y and Z) were taken and the concentrations of the substances were measured. The results are shown in the following table.

vein	carbon dioxide concentration / arbitrary units	oxygen concentration / arbitrary units	urea concentration / arbitrary units
X	43	33	2.9
Y	47	35	6.6
Z	33	97	5.3

What illness could the person be suffering from?

- A atherosclerosis  
 B diabetes mellitus  
 C emphysema  
 D kidney failure



**Geylang Methodist School (Secondary)**  
**End-of-Year Examination 2016**

Candidate  
Name

Class

Index  
Number

**BIOLOGY**  
Paper 2

5158/02  
Sec 3 Express

Additional materials: Nil

1 hour 30 minutes

Setter: Mrs Gan Huey Shin

13 Oct 2016

**READ THESE INSTRUCTIONS FIRST**

Write your name, index number and class on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper. Do not use staples, paper clips, highlighters, glue or correction fluid.

**Section A**

There are a total of 40 marks in this section. Answer **all** questions in the spaces provided on the question paper.

**Section B**

There are **three** questions and a total of 30 marks in this section. Answer all the questions on separate writing papers.

You are advised to spend no longer than one hour on Section A and no longer than 30 minutes on Section B.

At the end of the examination, fasten all your answers to Section B to this Question Paper. The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use		
Section A		40
Section B		
6		10
7		10
8		10
Total		70

This document consists of 16 printed pages.



### Section A

Answer all questions in the spaces provided.

- 1 Ten similar strips of the lower epidermis of onion leaves are placed on different microscope slides. Drops of different sucrose concentrations are added to each strip separately. After ten minutes, each slide is observed under the microscope.

The percentage of plasmolysed cells is calculated and the results plotted in a graph, shown in Fig. 1.1.

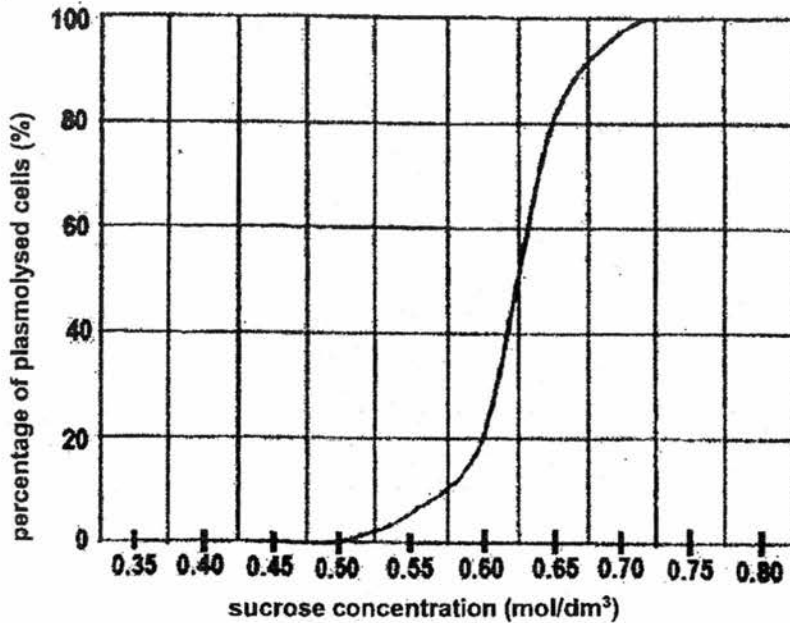


Fig. 1.1

- (a) Name the process investigated in this experiment.

\_\_\_\_\_ [1]

- (b) Which sucrose concentration is closest to the cell sap concentration of onion epidermal cells? Give a reason for your answer.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

- (c) (i) From the graph, find the sucrose concentration where 50% of the cells are plasmolysed. Indicate on Fig. 1.1 how you find this value.

\_\_\_\_\_ [1]

- (ii) Explain what happened to the onion epidermal cells.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

[Total: 7]

- 2 Mycoprotein is a protein derived from fungi. It is cultivated as a meat alternative for human consumption. Table 2.1 shows the nutrient composition of mycoprotein and uncooked beef.

**Table 2.1**

nutrient	dry mass/g per 100g	
	mycoprotein	uncooked beef
carbohydrate	20.6	0.0
protein	49.0	51.4
fat	9.2	48.6
fibre (roughage)	19.5	0.0

- (a) Based on the data in Table 2.1, why do you think eating mycoprotein is better for health than eating beef? Suggest two reasons.

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[2]

- (b) (i) Calculate the dry mass of mycoprotein **not** represented by carbohydrate, protein, fat or fibre. Show your working in the space below.

answer \_\_\_\_\_ g [2]

- (ii) Suggest what this dry mass, from (b)(i), might contain.

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[1]

- (c) Describe a food test that may be used to distinguish between mycoprotein and uncooked beef extracts.

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[3]

[Total: 8]

- 3 Fig. 3.1 shows how a blocked blood vessel in the heart can be by-passed using an artificial blood vessel.

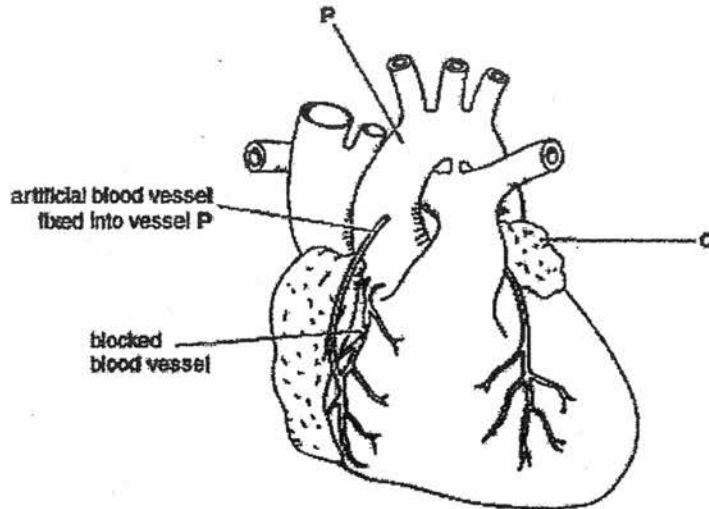


Fig. 3.1

- (a) (i) Name the blocked blood vessel.

\_\_\_\_\_ [1]

- (ii) Identify structures P and Q on Fig. 3.1.

P : \_\_\_\_\_

Q : \_\_\_\_\_ [2]

- (b) Sometimes, instead of using an artificial blood vessel for the graft, a vein is taken from elsewhere in the patient's body.

Suggest two reasons in which a vein might not be as suitable for carrying blood to the heart muscles as an artery.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(c) Fig. 3.2 shows the same blood vessel as in (a)(i), but this time the blockage is being treated with the use of a 'stent'.

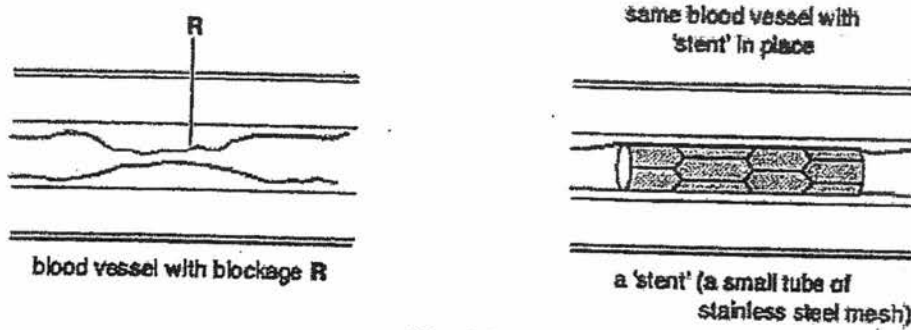


Fig. 3.2

(i) Name two components of the material that is causing the blockage at R.

1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

(ii) Suggest and explain why patients are given 'anti-platelets' drugs before inserting the stent.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[2]

[Total: 9]

- 4 A student used the apparatus shown in Fig. 4.1 to measure the rate of respiration of an insect. The coloured water droplet took two hours to travel from the initial position to the final position. The total cross-sectional area of the capillary tube was  $0.02 \text{ cm}^2$ .

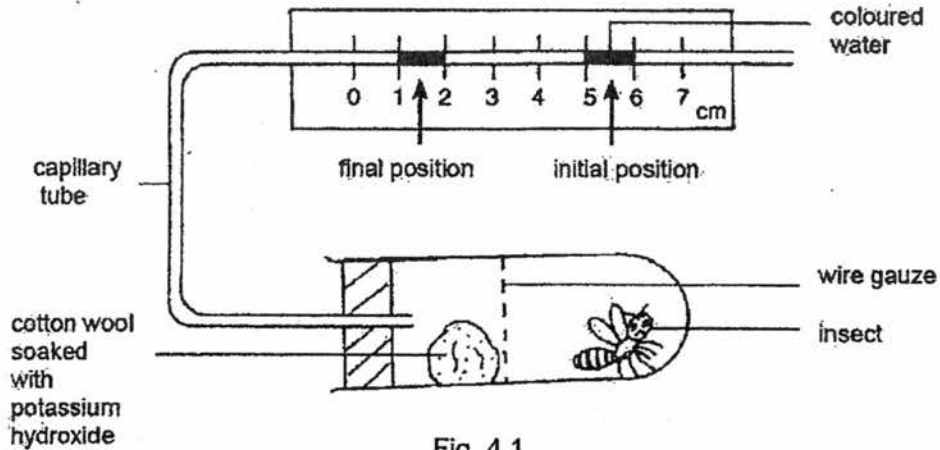


Fig. 4.1

- (a) State the function of the cotton wool soaked with potassium hydroxide.

\_\_\_\_\_ [1]

- (b) (i) Suggest a control for this experiment.

\_\_\_\_\_ [1]

- (ii) Suggest a precaution that must be taken while setting up the control mentioned in (b)(i).

\_\_\_\_\_ [1]

- (c) Calculate the rate of respiration of the insect.

Rate of respiration of the insect = \_\_\_\_\_ [2]

(d) Explain fully why the coloured water travelled towards the boiling tube.

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[3]

[Total : 8]



- 5 Table 5.1 shows the clearance time of some substances for a patient undergoing kidney dialysis.

Table 5.1

substance in blood	units	concentration in blood		
		time = 0 h	time = 0.5 h	time = 6 h
urea	mg/l	176	144	126
creatinine	mg/l	3.4	2.7	2.5
glucose	mg/l	134	128	138
potassium	mg/l	4.3	4.1	4.1
sodium	mg/l	143	137	135
chloride	mg/l	108		107

- (a) Calculate the average hourly rate at which urea is removed from the blood of the kidney dialysis patient. Show your working.

average hourly rate = \_\_\_\_\_ [2]

- (b) Explain the results when  $t = 6$  h for potassium.

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[2]

- (c) The table did not show the concentration of proteins in blood.

Predict how the trend of proteins would look like between  $t = 0$  h to  $t = 6$  h. Give a reason for your answer.

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[2]

- (d) During each treatment, a patient has to undergo dialysis for a few hours. Suggest one way the time can be shortened. Explain your answer.

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[2]

[Total : 8]

**End of Section A**

**Section B**

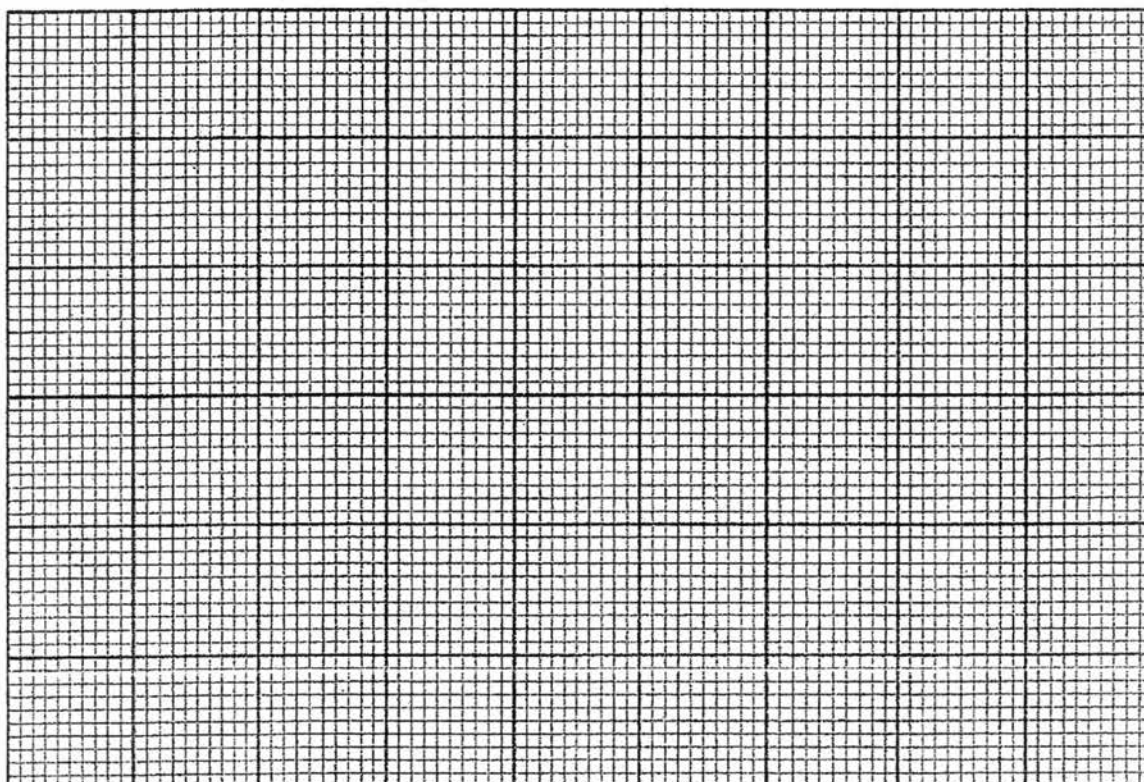
Answer all questions on writing paper.

- 6 The time needed to digest starch by salivary amylase at different temperatures was investigated. Both the starch suspension and salivary amylase solution were mixed together in equal quantities at the required temperature. Samples of this mixture were removed at 1-minute intervals and tested for starch.

The results are given in the table below.

temperature (°C)	time to digest starch (minutes)
15	25
20	15
25	9
30	5
35	3
40	7
45	25

- (a) Draw a graph of temperature against the time taken to digest starch on the grid below. [4]



- (b) From the graph, find out the temperature at which starch was digested most rapidly.

\_\_\_\_\_ [1]

- (c) Explain why the time taken to digest starch at 35 °C is different from the time taken to digest starch at 15 °C.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

- (d) The experiment was repeated at 35 °C, but some dilute hydrochloric acid was added to the mixture.

- (i) Predict the result for this experiment.

\_\_\_\_\_ [1]

- (ii) Explain the result for (d)(i).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

[Total: 10]

7 (a) Describe the part played by the cells lining the trachea.

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[2]

(b) Explain how the alveoli are adapted for gaseous exchange.

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[3]

(c) Explain why smoking reduces the efficiency of the functions of the respiratory and circulatory systems.

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[Total: 10]

8 (a) Describe what happens to fats as they pass through the following regions of the alimentary canal:

(i) the mouth cavity;

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(ii) the duodenum;

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(iii) the rest of the small intestine.

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[6]

(b) As a result of intestinal disease(s), parts of the alimentary canal are sometimes surgically removed. Suggest the effect on lifestyle and on digestive function of removing

(i) the stomach;

digestive function: \_\_\_\_\_

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lifestyle: \_\_\_\_\_

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[2]

(ii) the colon.

digestive function: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

lifestyle: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

[Total: 10]

**End of Paper**

Geylang Methodist School (Secondary)  
End of Year Examination 2016

BIOLOGY Marking Scheme  
Paper 1

5158/01  
Sec 3 Express

C	C	D	C	A	B	D	C	A	B
A	A	A	D	D	C	A	D	C	D
D	D	C	D	C	A	D	B	B	D

Paper 2  
Section A

- 1 (a) Osmosis
- (b)
  - 0.35 – 0.50 mol dm<sup>-3</sup>
  - There is no net movement of water molecules.
- (c) (i) ≈ 0.63 mol dm<sup>-3</sup>
- (ii)
  - sucrose solution has lower water potential than cell sap [1]
  - water moved down water potential gradient / from region of higher water potential to region of lower water potential [1]
  - and left cytoplasm and vacuole by osmosis, across a partially permeable membrane [1]
- 2 (a) Any two of the following:
- Mycoprotein has 20.6% carbohydrates whereas uncooked beef does not have any carbohydrates. These carbohydrates are able to provide the energy needed for the organism.
  - Mycoprotein has 9.2% fat as compared to 48.6% in uncooked beef. Too much fat intake can lead to fatty deposits in the arteries.
  - Mycoprotein has 19.5% fibre whereas uncooked beef does not have any fibre. Fibre helps to prevent constipation.
- (b) (i) 49+9.2+19.5+20.6 = 98.3 [1]  
100 - 98.3 = 1.7g [1]
- (ii) Any of the following:
- mineral ions/salt
  - vitamins
- Reject Water

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GMS(S)/BiologyP2/EOY/2016/3E

- (c) Correct identification of nutrient + correct description of chemicals used in test [1] + correct observations of test
- Iodine test for starch  
Test: Add a few drops of iodine onto mycoprotein and beef extracts.  
Observation: Iodine on mycoprotein will turn blue-black while iodine on uncooked beef will remain yellowish-brown
- OR
- Benedict's test for reducing sugar  
Test: Add equal volumes of copper (II) sulfate solution to the extracts and place the test tubes in boiling water.  
Observation: Test tube containing mycoprotein extract will produce a brick red / orange precipitate while the test tube containing uncooked beef extract remains blue.
- 3 (a) (i) Coronary artery  
(ii) P : aortic arch / aorta  
Q : left atrium
- (b) 1. The walls of the vein are thinner, less muscular and less elastic than the wall of the coronary artery and hence, may not be able to withstand the blood pressure and may burst.
2. Veins have internal semilunar valves that may block the flow of blood if placed in the wrong direction.
- (c) (i) 1. Cholesterol  
2. Saturated fats
- (ii)
  - As the coronary artery is cut, clotting / coagulation of blood occurs as a protective mechanism of the body.
  - To prevent the formation of blood clots that may cause blockage in the artery, 'anti-platelet' drugs are given.
- 4 (a) To absorb carbon dioxide produced by the respiration of the insect in the boiling tube.
- (b) (i) Replace the insect with a dead insect  
(ii) Sterilise the dead insect
- (c) Rate of respiration = ( 3 X 0.02 ) cm<sup>3</sup> / 2h      Working - 1 mark  
= 0.06 / 2      Final answer with unit  
= 0.03 cm<sup>3</sup> per hour      - 1 mark
- (d)
  - The insect uses oxygen to support aerobic respiration.
  - Carbon dioxide released during respiration is absorbed by the potassium hydroxide solution.
  - The decrease in gas volume inside the boiling tube creates a vacuum which causes the air column in the capillary tube to move to occupy the space.



- 5 (a) Average hourly rate =  $50 / 6$   
=  $8.33 \text{ mg/h}$
- (b) • The dialysis fluid contains the same concentration of potassium ions.  
• No net movement of potassium ions.
- (c) • Trend should show a constant value.  
• Proteins are too large to pass through the tubing, hence no change in concentration.
- (d) • Increase the number of coils of cellophane tubing  
• Larger area to speed up diffusion of urea

## Section B

- 6 (a) Correct axes with titles & units – 1m  
Curve plotted – 1m  
Correct points plotted – 1m  
Appropriate scale used – 1m
- (b)  $35^\circ\text{C}$  / read off from graph
- (c)  $35^\circ\text{C}$  is the optimum working temperature of amylase. It breaks down starch at the fastest rate at this temperature.  
At  $15^\circ\text{C}$ , the temperature is low and amylase is less active, thus time taken to digest starch is longer.
- (d) (i) time taken would be longer than 3 mins.  
(ii) Optimal pH for salivary amylase is 7. Salivary amylase is denatured by hydrochloric acid as it has a pH lower than 7.
- 7 (a) • Gland cells produce mucus to trap dust and bacteria / pathogens in the inhaled air.  
• Ciliated cells with cilia help to sweep the mucus with trapped dust towards pharynx.
- (b) • Thin film of moisture enables gases to dissolve for easy diffusion across alveolar wall.  
• One cell thick alveolar wall shortens diffusion barrier / distance for faster diffusion of gases.  
• Walls of alveoli are richly supplied with blood capillaries to maintain the concentration gradient of gases for rapid absorption and transportation of oxygen to and carbon dioxide from body cells.
- (c) • Cigarette smoke contains carbon monoxide gas which combines with haemoglobin to form carboxyhaemoglobin;  
• This reduces the oxygen transport efficiency of red blood cells.
- OR
- Nicotine makes blood clot easily in the arteries;  
• And this leads to an increased risk of coronary heart disease.

AND

- Tar and irritants present in cigarette smoke paralyses cilia lining the air passages;
- Hence, dust particles trapped in the mucus lining the airways cannot be removed;
- This increased the risk of chronic bronchitis and emphysema.

- 8 a (i) Mouth cavity:
- Fats not hydrolysed/digested because no enzymes present to hydrolyse/digest it.
- (ii) the duodenum;
- emulsified by bile released from the gall bladder.
  - This increases the surface area of the fats and speeds up their digestion by pancreatic lipase.
- (iii) the rest of the small intestine.
- Fats are fully hydrolysed/ digested by pancreatic and intestinal lipase in the small intestine into fatty acids and glycerol.
  - These are then absorbed by the lacteals in the villi of the small intestine.
- (b) (i) the stomach;
- Protein digestion will be greatly reduced as proteins from milk are also not digested as no HCl present.
  - - Lifestyle: smaller but more frequent meals/ meat to be cut up into - smaller pieces before consumption
  - Cleanliness of food must be increase to prevent food poisoning.
  - eat less meat [any 1 – 1m]
- (ii) the colon.
- Water and mineral salts absorption will be reduced.
  - Lifestyle: more frequent intake of water, increase intake of fruits/dietary fibre, mineral supplements.