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KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL
2016 End of Year Examination
Secondary 3 Express

NAME

CLASS INDEX NUMBER

Biology

11 October 2016

Additional Materials: Multiple Choice Answer Sheet

2 hours

Setter: Mrs. Chow Mei Chee

READ THESE INSTRUCTIONS FIRST

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

Section A

Answer all questions.

Write in soft pencil.

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

Write your class, name and index number on the Multiple Choice Answer Sheet in the spaces provided.

There are **thirty** questions in Section A. 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 separate Multiple Choice Answer Sheet.

Section B

Answer all questions.

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

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Write your answers in the spaces provided in the Question Paper.

Section C

Answer all questions.

Write your answers in the spaces provided in the Question Paper.

Question 8 is in the form of an **Either/Or** question.

Only one part should be answered.

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

Parent's Signature	
For Examiner's Use	
Section A	
Section B	
Section C	
Total	

This document consists of 37 printed pages, including the cover page.

147

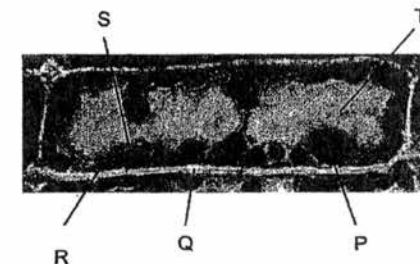
[Turn over

2

Section A (30 marks)

Answer all questions.

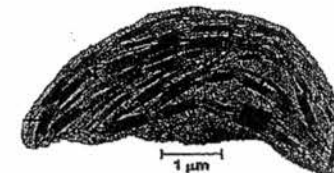
- 1 The photomicrograph shows a cell from a pondweed.



Which of the labeled parts would be visible in an animal cell under the light microscope?

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

- 2 Which statement best describes the function of the organelle shown?

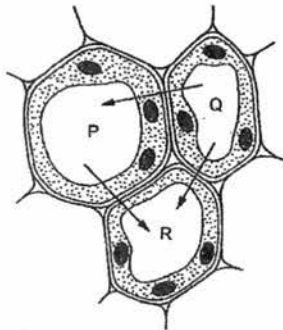


- A absorbs light energy for the manufacture of food by the cell
B controls the activities of the cell
C is involved in the oxidation of food substances to release energy
D is the site where proteins are synthesised

- 3 A special dye propidium iodide stains DNA. Which cell would show no staining with propidium iodide?

- A cheek cell
- B phagocyte
- C red blood cell
- D yeast cell

- 4 The diagram shows three plant cells labelled P, Q and R. The arrows show the direction of water movement by osmosis.



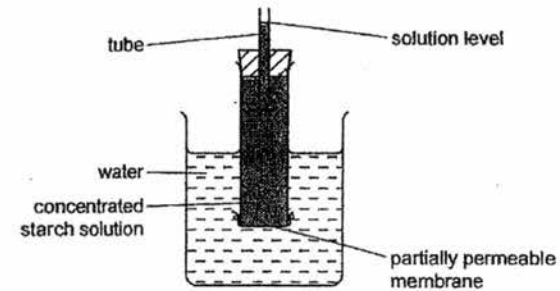
What is the correct order of water potential in the cells, from the highest to the lowest?

	highest	middle	lowest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	R	P	Q

- 5 Several plant roots were soaked for 24 hours in a metabolic poison that is known for reducing the activity of mitochondria. What is the expected effect on the absorption of water and mineral salts in the roots?

	absorption of water	absorption of mineral salts
A	no effect	no effect
B	no effect	slower
C	slower	slower
D	slower	no effect

- 6 The diagram represents an apparatus used to investigate osmosis.



Which molecules will move across the partially permeable membrane and which change will occur in the solution level?

	molecules	solution level
A	starch	fall
B	starch	rise
C	water	fall
D	water	rise

5

- 7 The table shows the results of tests carried out on a drink.

test	result
biuret	blue colour
Benedict's	orange precipitate
ethanol emulsion	white emulsion formed
iodine	yellow colour

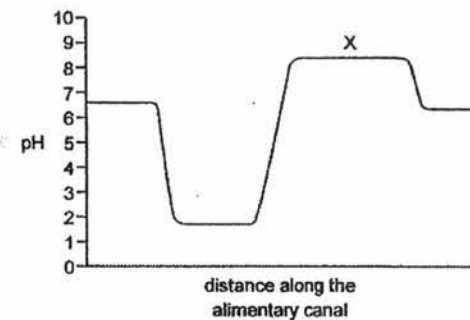
What does the drink contain?

- A protein and starch only
 B fat and reducing sugar only
 C fat, protein and reducing sugar only
 D fat, protein, reducing sugar and starch
- 8 In which regions of the alimentary canal does amylase act?
- A mouth cavity and duodenum
 B mouth cavity and pancreas
 C stomach and ileum
 D stomach and pancreas

149

6

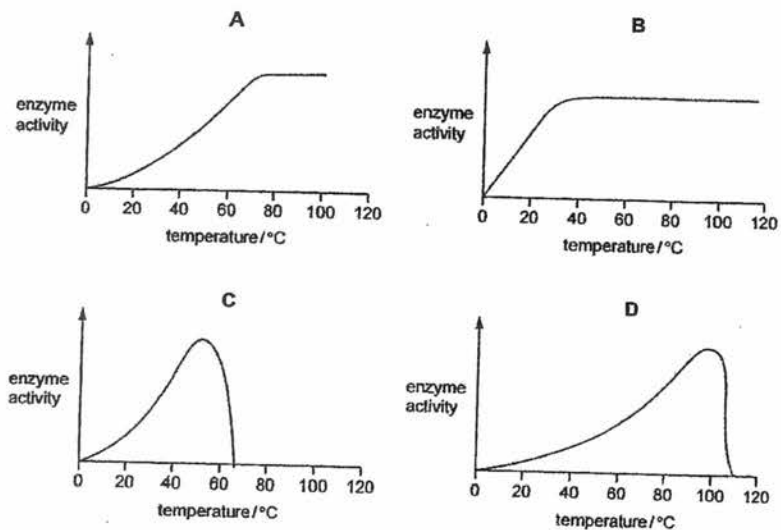
- 9 The graph shows how the pH changes along the alimentary canal.



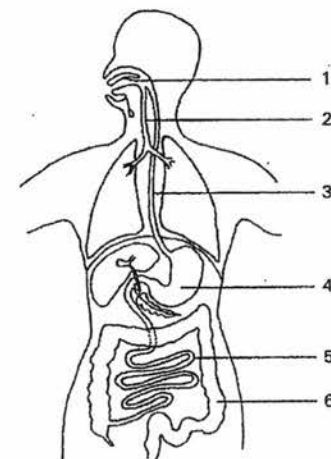
What is the region labelled X?

- A large intestine
 B oesophagus
 C small intestine
 D stomach

- 10 A bacterium lives in hot springs at temperatures of 75°C to 85°C.
Which graph represents the activity of enzymes found in these bacteria?



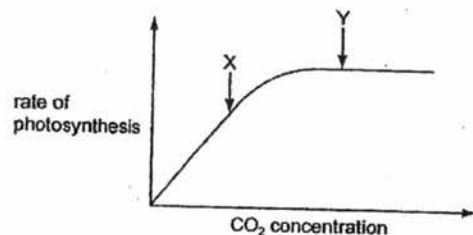
- 11 The diagram shows the digestive system and respiratory system of man.



Which of the following processes that take place in the labelled parts are correct?

	hydrolysis	osmosis	peristalsis
A	2	5	1
B	4	6	1
C	5	6	3
D	6	5	2

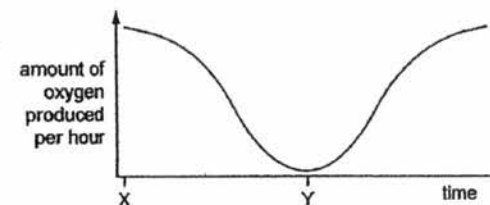
- 12 The graph shows the effect of carbon dioxide (CO_2) concentration on the rate of photosynthesis.



What could be limiting the rate of photosynthesis at points X and Y?

	X	Y
A	carbon dioxide concentration	carbon dioxide concentration
B	carbon dioxide concentration	light intensity
C	light intensity	carbon dioxide concentration
D	light intensity	light intensity

- 13 The graph shows the amount of oxygen produced by a green plant, growing outdoors, during a 24-hour period.



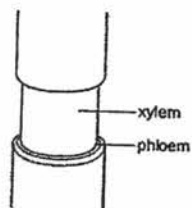
Which processes are occurring at time X and Y?

	time X		time Y	
	photosynthesis	respiration	photosynthesis	respiration
A	✓	✓	x	✓
B	✓	x	✓	x
C	x	✓	x	✓
D	x	✓	✓	x

- 14 In the manufacture of proteins, plants use some chemicals which are absorbed from the soil and other chemicals, which are already present within the plant. Which one of the following combinations of chemicals is needed for the manufacture of proteins?

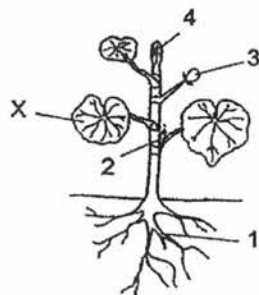
	chemicals absorbed from soil	chemicals already present within the plants
A	carbohydrates	amino acids
B	nitrates	carbohydrates
C	nitrogen	fats
D	water	nitrates

- 11
- 15 The figure shows the stem of a plant.
A ring of the outer tissue including the phloem has been removed.



Which of the following is a consequence of the removal?

- A Amino acids and sucrose cannot pass to the roots.
 - B Dissolved salts cannot pass to the roots.
 - C Water cannot pass to the leaves.
 - D Water cannot pass to the roots.
- 16 The diagram shows a green plant.



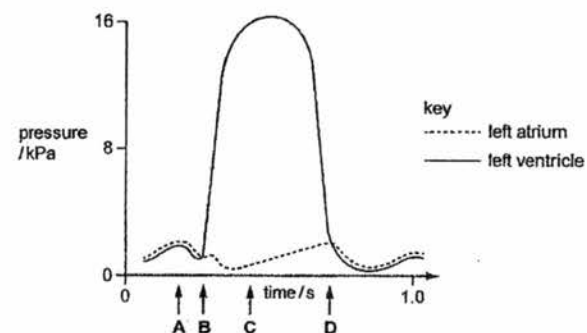
Where will food made by leaf X be found after translocation?

- A 1 only
- B 1 and 2 only
- C 1, 2 and 3 only
- D 1, 2, 3 and 4

- 12
- 17 What could increase the rate of water uptake by a shoot?

- A covering the shoot with a black plastic bag
- B covering the shoot with a clear plastic bag
- C removing the leaves from the shoot
- D shining a bright light onto the shoot

- 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 close?



- 19 The table shows the blood groups of four people and the type of blood each received in a transfusion.
Which person is at risk from agglutination?

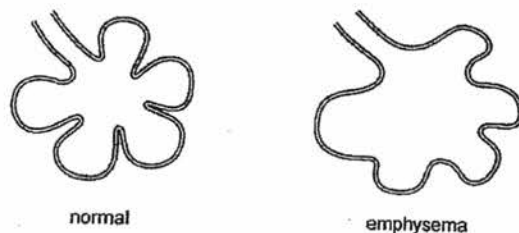
	blood group	blood type received in transfusion
A	A	O
B	B	AB
C	AB	B
D	O	O

- 20 After muscular exercise, which blood vessel carries the lowest concentration of carbon dioxide?

13

- A hepatic vein
- B pulmonary artery
- C pulmonary vein
- D vena cava

- 21 The diagrams show the structure of the alveoli in the lungs of a normal person and in a smoker with emphysema.



What is the effect of emphysema?

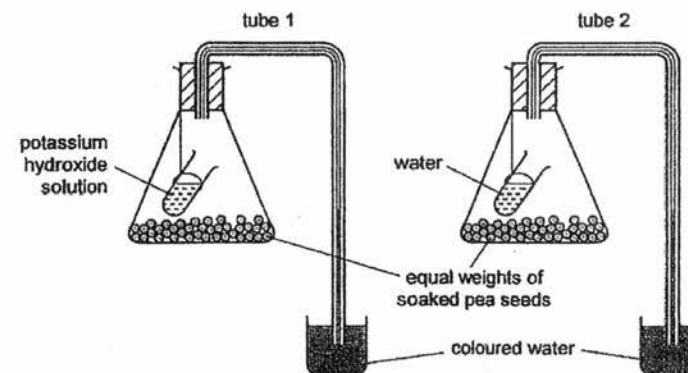
- A increased chance of lung cancer
- B inflammation of the walls of the airways
- C less difficulty in breathing in and out
- D less efficient gaseous exchange

- 22 Scientists believe that absorption of mineral ions in plants requires energy from respiration. Which observation best supports this idea?

14

- A Carbohydrate is stored in the roots.
- B Living roots give off carbon dioxide.
- C The root hairs have a large surface area.
- D Uptake of nitrates is reduced in lower oxygen concentrations.

- 23 An experiment is set up as shown.



After four hours, the coloured water will

- A be higher in tube 1 than in tube 2.
- B be higher in tube 2 than in tube 1.
- C have gone down by the same amount in both tubes.
- D have gone up by the same amount in both tubes.

- 24 Accumulation of mucus in the nasal cavity could be reduced by blowing the nose. What happens to the following structures when someone blows his nose?

	external intercostal muscles	diaphragm	air pressure in thorax
A	relax	arches	increases
B	relax	flattens	increases
C	contract	arches	decreases
D	contract	flattens	decreases

- 25 In the human breathing system, which features maintain the carbon dioxide gradient between the alveoli and the outside air?

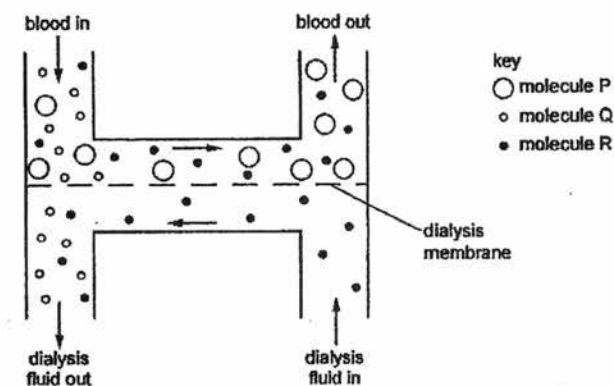
1. blood continually pumped to the alveoli
2. breathing in and out
3. moist alveolar surfaces
4. thin alveolar walls

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

- 26 About 180 litres of fluid are filtered by the kidney every day. Only 1.5 litres are excreted in urine. A failure of which organ would result in a higher volume of urine being formed?

- A gall bladder
B pancreas
C pituitary gland
D spleen

- 27 The diagram shows what happens to molecules of glucose, protein and urea as blood passes through a kidney dialysis machine.



What are molecules P, Q and R?

	molecule P	molecule Q	molecule R
A	glucose	protein	urea
B	glucose	urea	protein
C	protein	glucose	urea
D	protein	urea	glucose

- 28 When a decrease in the water potential of blood occurs, which of the following events take place?

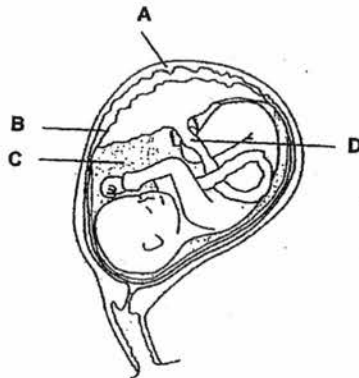
	ADH production	permeability of kidney tubules	volume of urine
A	decreases	increases	decreases
B	increases	decreases	decreases
C	increases	increases	decreases
D	increases	increases	increases

29 Which of the following would be the result of cutting sperm ducts on the right and left sides in a male animal?

1. The animal would become sterile.
2. The animal would be unable to pass urine.
3. The animal would be unable to form sperms.
4. Male sex hormones would no longer circulate in the blood.

- A 1 only
 B 1 and 2 only
 C 3 and 4 only
 D 2, 3 and 4 only

30 The diagram shows a developing foetus. Which part acts as a shock absorber that cushions the foetus during development?



End of Section A

Name: _____ () Class: _____ Date: _____

Section B
(40 marks)

Answer all questions in the spaces provided.

- 1 A student is given a Petri dish containing starch mixed with agar jelly. The student makes five wells each of diameter 10 mm in the agar. She fills the wells with solutions of amylase, each with a different pH. After 24 hours, she pours iodine solution onto the agar jelly. The iodine solution turns the starch in the agar jelly a dark blue colour. Fig. 1.1 shows the appearance of the Petri dish.

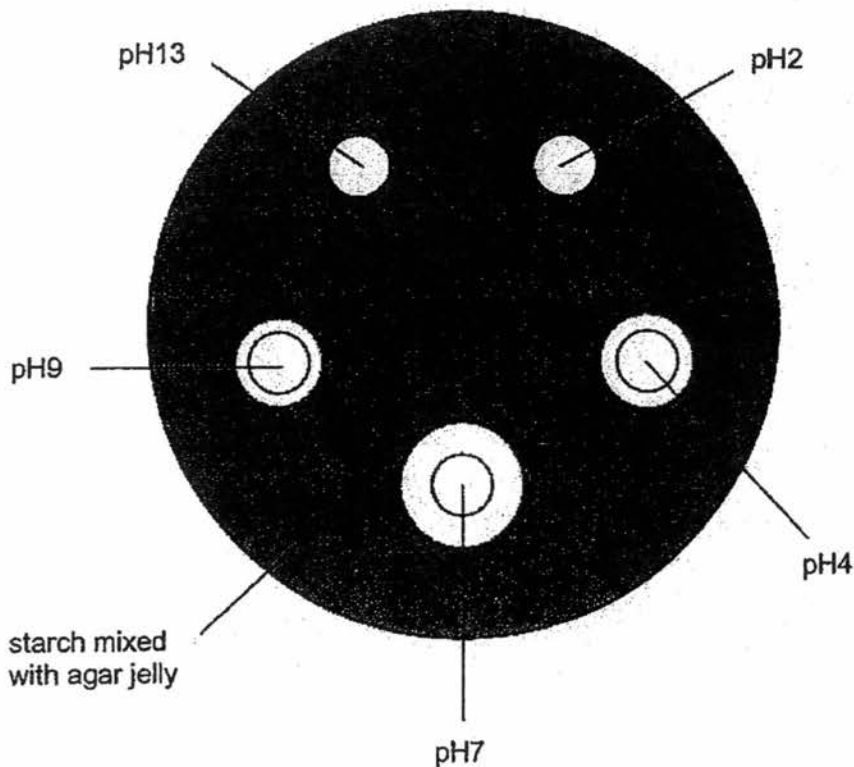


Fig. 1.1

- (a) The student measures the clear area around each well using a ruler. Two have been done for you. Complete the remainder of the table.

pH of amylase solution	diameter / mm
2	
4	14
7	
9	
13	9

[1]

- (b) (i) Explain why there is a clear zone around some of the wells containing amylase.

.....

 [2]

- (ii) Explain why the clear zones have a range of different diameters.

.....

 [2]

- (c) (i) The student keeps the Petri dish at 20°C to control the temperature in order to make a valid comparison between each pH.

Name two other variables that the student needs to keep constant.

.....
 [2]

- (ii) The student repeats the experiment, keeping the Petri dish at 37°C on this occasion.
On Fig. 1.2, draw the results you would expect to see.

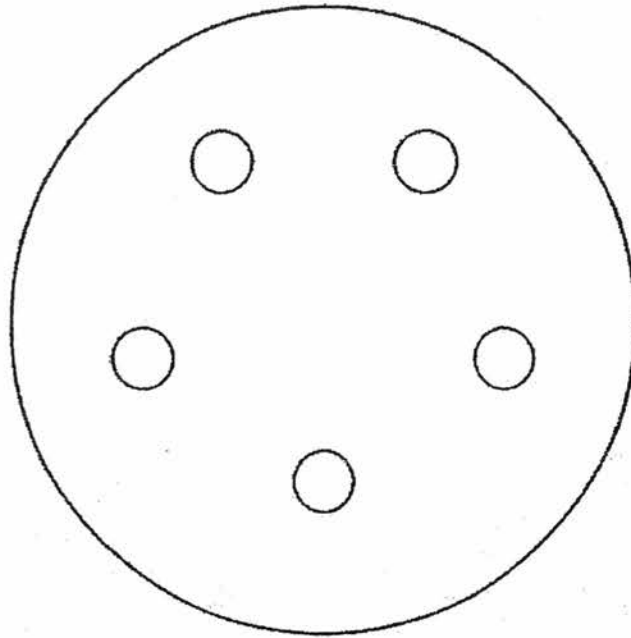


Fig. 1.2

[1]

[Total: 8]

2 Fig. 2.1 shows a cross-section of a leaf.

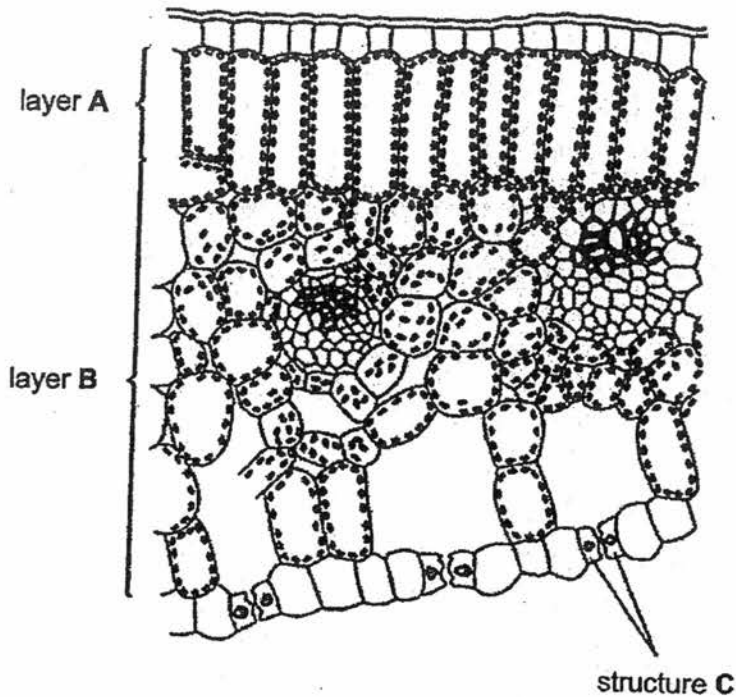


Fig. 2.1

- (a) Each part of the leaf is adapted for a specific function.
Name each part of the leaf and explain how it helps the leaf in photosynthesis.

(i) Layer A

.....

.....

..... [2]

(ii) Layer B

.....

.....

..... [2]

(iii) Structure C

.....

 [2]

- (b) A student examined the upper and lower surfaces of a leaf from a land plant using a microscope.

Fig. 2.2 shows the lower surface of the leaf.

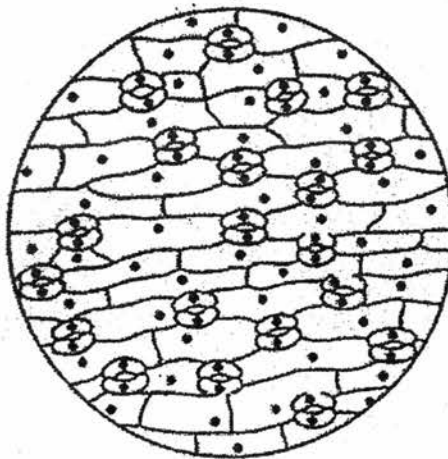


Fig. 2.2

- (i) How many stomata are shown in Fig. 2.2?

..... [1]

- (ii) Suggest how the upper surface of the leaf in the land plant would differ from the diagram in Fig. 2.2.

.....
 [1]

[Total: 8]

- 3 The liver is an organ with a large number of different functions. Fig. 3.1 shows the liver, its blood supply and some other organs. The blood vessels are labelled P, Q and R.

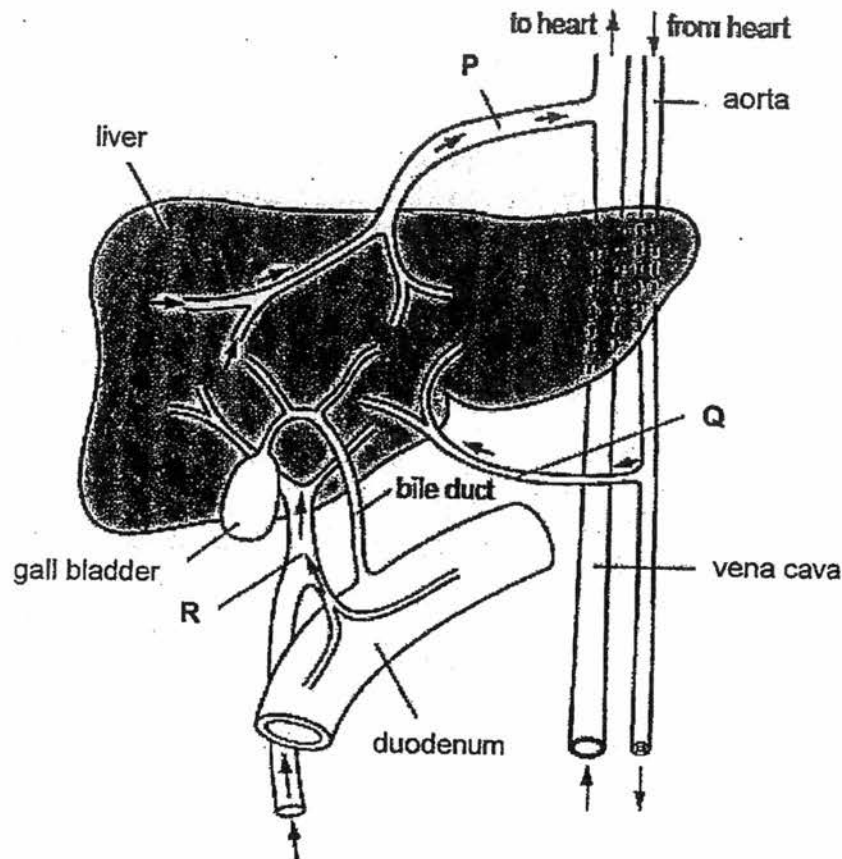


Fig. 3.1

- (a) A person eats a meal containing protein and carbohydrate. Use the letter, P, Q or R, to identify the blood vessel with the highest concentration of glucose, oxygen and urea as this meal is absorbed.

blood vessel with highest concentration of glucose

blood vessel with highest concentration of oxygen

blood vessel with highest concentration of urea

[3]

- (b) Describe the effects on the liver due to excessive long-term consumption of alcohol.

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

- (c) Cholesterol can accumulate in the gall bladder to form gall stones. These gall stones may stop bile flowing from the liver through the bile duct and into the duodenum. Explain the possible effect of gall stones on the digestion of fat.

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

[Total: 8]

4 Humans carry out aerobic and anaerobic respiration.

- (a) Compare the two types of respiration by completing Table 4.1.
Place a tick (✓) to show which statements are correct for each type of respiration in humans.

Table 4.1

statement	aerobic respiration	anaerobic respiration
produces lactic acid		
releases carbon dioxide		
uses glucose		
uses oxygen		

[2]

- (b) Athletes compete in races of different distances.
Fig. 4.1 shows the percentage of energy released by aerobic and anaerobic respiration during these races.

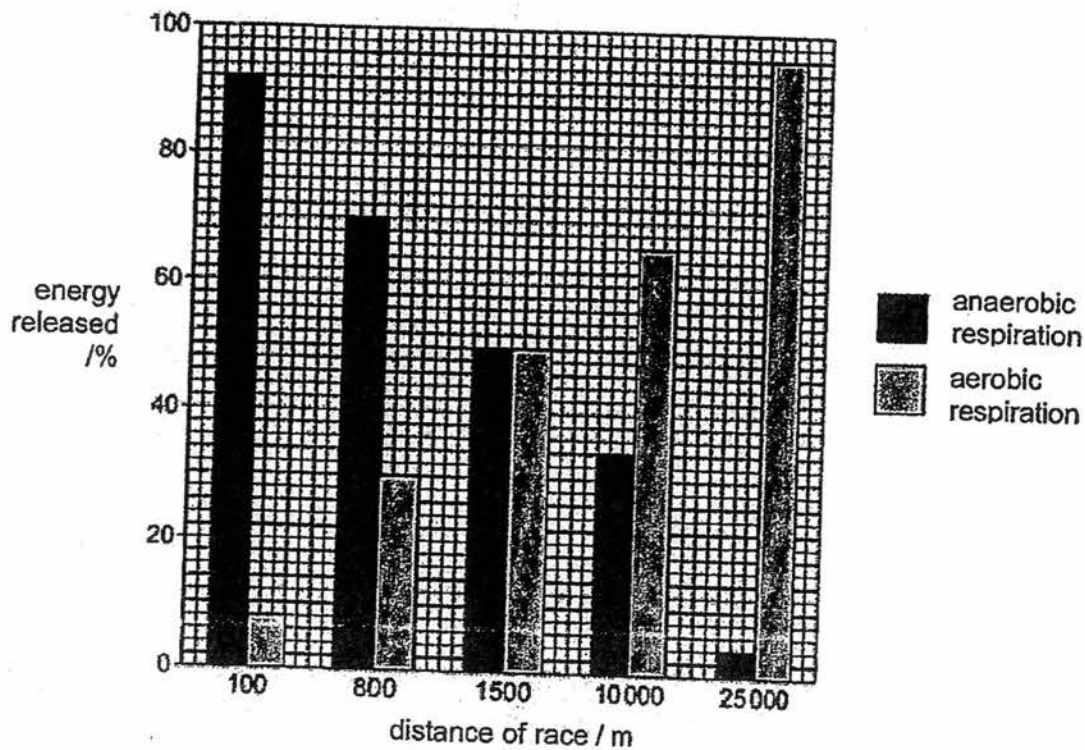


Fig. 4.1

With reference to Fig. 4.1 :

- (i) state the percentage of energy that is provided by anaerobic respiration in a 100m race

..... % [1]

- (ii) state the length of race in which 96% of the energy is provided by aerobic respiration

..... m [1]

- (iii) state the length of race where the total energy released by each type of respiration is equal

..... m [1]

- (c) State two conclusions that can be made from the data shown in Fig. 4.1.

1.

..... [1]

2.

..... [1]

[Total: 7]

- 5 Fig. 5.1 shows changes in the uterus during the menstrual cycle.

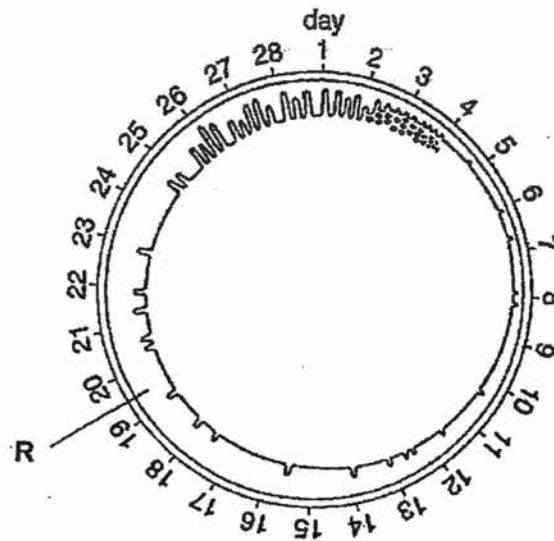


Fig. 5.1

- (a) Identify R.
- [1]
- (b) State the days when each of the following processes are most likely to occur during the cycle :
- (i) fertilisation
- [1]
- (ii) implantation
- [1]
- (c) Suggest and explain why blood must not pass directly from the mother to the foetus during pregnancy, even though it contains substances necessary for foetal development.
-
-
- [2]

- (d) Table 5.1 shows that temperature determines whether the eggs of a particular species of reptile hatch into a male or a female.

Table 5.1

	temperature / °C									
	29	30	31	32	33	34	35	36	37	38
% of females hatching	100	100	99	50	1	0	50	99	100	100
% of males hatching	0	0	1	50	99	100	50	1	0	0

- (i) State the ranges of temperatures at which females are more likely than males to hatch from the eggs.

..... and [2]

- (ii) State two ways in which the production of a male human child differs from the production of the male form of this reptile.

1.

.....

2.

.....

[2]

[Total: 9]

End of Section B

Name: _____ () Class: _____ Date: _____

Section C
(30 marks)

Answer **all three** questions. Question 9 is in the form of an **Either/Or** question.
Only **one** part should be answered.

- 6 Glucose is absorbed in the small intestine and transported in the blood. The kidneys filter the blood and reabsorb the glucose.
If the blood contains more than 180 mg of glucose per 100 cm³, the kidney cannot reabsorb it all and some is present in the urine. 180 mg of glucose per 100 cm³ is called the renal threshold.

A doctor suspects that a patient has diabetes because a urine test is positive for glucose. The patient takes a glucose tolerance test by drinking a solution of glucose. The doctor records the patient's blood glucose concentration at 30 minute intervals for four hours.

Table 6.1 shows the results.

Table 6.1

time / min	30	60	90	120	150	180	210	240
blood glucose concentration / mg per 100 cm ³	120	190	220	230	220	200	170	130

- (a) Plot a graph of the data in Table 6.1 on the grid in Fig. 6.1.

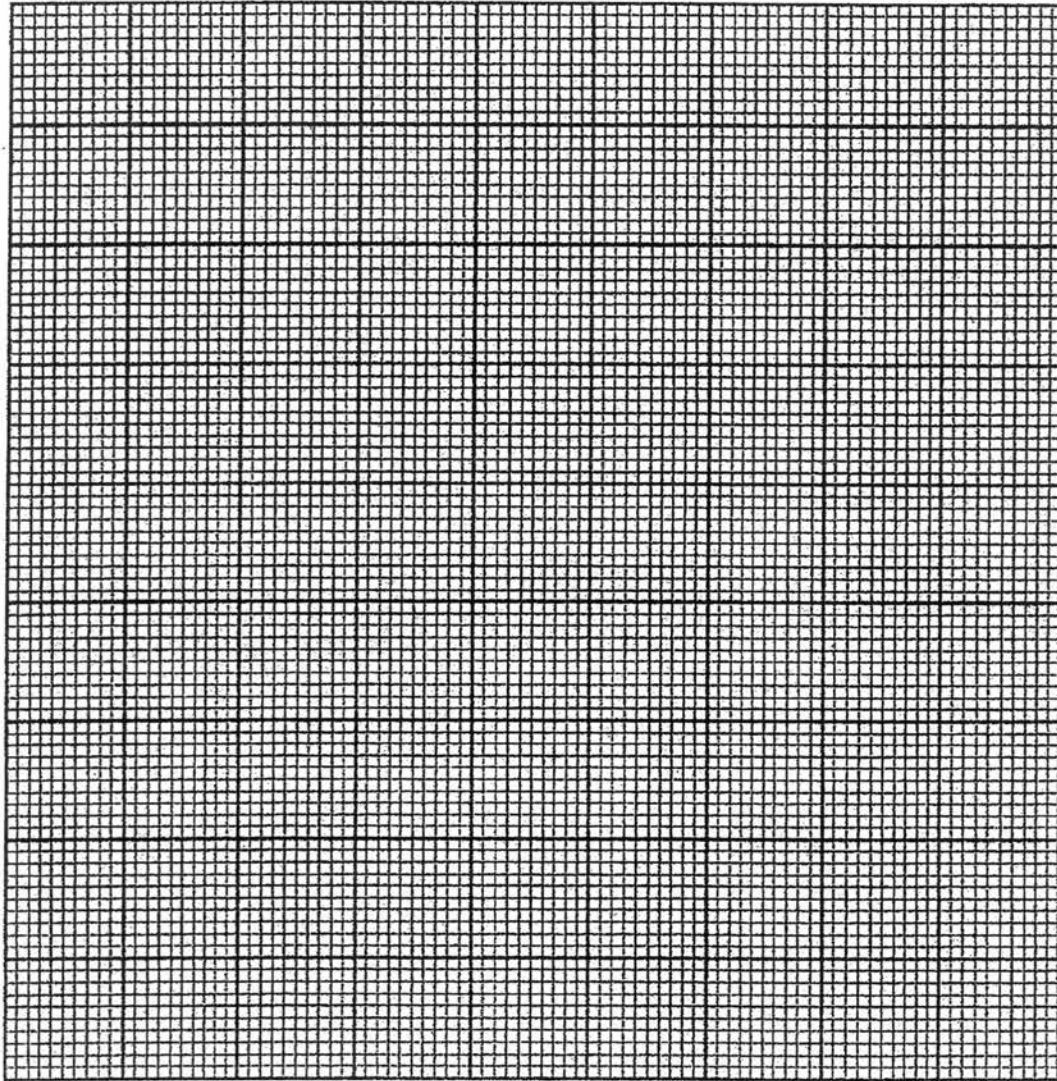


Fig. 6.1

[4]

- (b) (i) Draw a horizontal line on the grid in Fig. 6.1 to show the renal threshold. [1]
- (ii) State the time period when the kidney will produce urine containing glucose.
 [1]
- (iii) On the grid in Fig. 6.1, sketch the blood glucose concentrations that the doctor might expect if he repeated this test on someone who does not have diabetes. [1]
- (c) People who do not have diabetes maintain their blood glucose concentration below 180 mg per 100 cm³. Explain how the body does this.

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

7 (a) Briefly explain what is meant by the terms

- (i) digestion
- (ii) absorption

.....

.....

.....

.....

.....

.....

..... [3]

(b) Read the passage below and answer the questions that follow.

For many years, doctors believed that gastric ulcer (damage and bleeding of the stomach wall) was caused by excessive acid secretion in the stomach, so they used certain chemicals to treat ulcer patients. However, after recovery, many patients might develop gastric ulcer again.

In the 1980s, an Australian doctor, Barry Marshall, observed that all his ulcer patients had a type of bacteria called *Helicobacter pylori* in their stomach. He therefore put forward a new hypothesis about gastric ulcer. Based on this hypothesis, he treated his patients with antibiotics which are chemicals that kill bacteria. Many of his patients recovered rapidly and did not develop gastric ulcer again.

- (i) Many doctors were surprised at Marshall's observation because they thought that bacteria could not survive in the stomach. Why did they think so?

.....

.....

..... [2]

- (ii) Gastric ulcer can sometimes lead to stomach cancer. Patients with stomach cancer will need to have their stomach surgically removed. Discuss the effects on the digestive functions and changes to the lifestyle of such patients.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 10]

- [4]

- [3]

- (c) If an athlete is a regular smoker, state and explain how the carbon monoxide in cigarette smoke can affect the concentration of oxygen carried in his red blood cells.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

8 Or

(a) Compare the structures of arteries and veins in relation to their functions.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Describe the transfer of named substances between capillaries and tissue fluid.

.....

.....

.....

.....

.....

.....

..... [3]

- (c) Describe coronary heart disease, and state one possible cause of the disease.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

- END OF PAPER -

KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL
END OF YEAR EXAM 2016
BIOLOGY
SECONDARY 3 EXPRESS

MARKING SCHEME

Section A – Multiple Choice Questions (30 marks)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
A	A	C	C	B	D	B	A	C	D

Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
C	B	A	B	A	D	D	B	B	C

Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
D	D	A	A	A	C	D	C	A	C

Section B – Structured Questions (40 marks)

1	a	<table><tr><th>pH of amylase solution</th><th>diameter in mm</th></tr><tr><td>2</td><td>9 + 1</td></tr><tr><td>4</td><td>(14)</td></tr><tr><td>7</td><td>19 + 1</td></tr><tr><td>9</td><td>14 + 1</td></tr><tr><td>13</td><td>(9)</td></tr></table>	pH of amylase solution	diameter in mm	2	9 + 1	4	(14)	7	19 + 1	9	14 + 1	13	(9)	1 mark if all correct
pH of amylase solution	diameter in mm														
2	9 + 1														
4	(14)														
7	19 + 1														
9	14 + 1														
13	(9)														
	bi	Digestion / hydrolysis of starch by amylase into maltose No starch in the clear zone	1 1												
	bii	• Amylase denatured at pH 2 or 13 / low or high pH • Optimum pH where amylase works fastest at pH 7 • Amylase activity is slow in pH 9 or pH 4 Any 2 <i>R. rate of digestion differs with different pH</i>	2												
	ci	• Volume of amylase • Concentration of amylase • Depth of agar/ thickness of agar • Time • Source / type of amylase Any 2	2												
	cii	No change for pH 2 and pH 13 Wider for pH 4, pH 7, pH 9 than at 20°C	1												
Total			8												

2	ai	Palisade mesophyll	1
		Many chloroplasts - absorb / trap most light <i>R lots of chlorophyll</i>	1
	aii	Spongy mesophyll	1
		- Intercellular air spaces - diffusion of gases / gas exchange - Xylem / vascular bundle - transport water to cells Any 1	1
	aiii	Guard cells	1
		Control size of stoma - allows carbon dioxide to diffuse into the leaf	1
	bi	20	1
	bii	Fewer/ less / no stomata / guard cells	1
Total			8

3	a	Highest concentration of : glucose – R oxygen – Q urea – P	1 1 1
	b	• Liver cells replaced with fibrous tissue • Cirrhosis of the liver • liver cancer / liver failure • fatty liver / build up of fat deposits Any 2	2
	c	bile emulsify fats / break large globules of fat into smaller globules increases surface area to volume ratio of fat globules for faster digestion by lipase digestion of fat takes longer / is less efficient / is slowed down	1 1 1
Total			8

4	a	<table><tr><th>statement</th><th>aerobic respiration</th><th>anaerobic respiration</th></tr><tr><td>produces lactic acid</td><td></td><td>✓</td></tr><tr><td>releases carbon dioxide</td><td>✓</td><td></td></tr><tr><td>uses glucose</td><td>✓</td><td>✓</td></tr><tr><td>uses oxygen</td><td>✓</td><td></td></tr></table> ½ mark for each correct row	statement	aerobic respiration	anaerobic respiration	produces lactic acid		✓	releases carbon dioxide	✓		uses glucose	✓	✓	uses oxygen	✓		2
statement	aerobic respiration	anaerobic respiration																
produces lactic acid		✓																
releases carbon dioxide	✓																	
uses glucose	✓	✓																
uses oxygen	✓																	
	bi	92 (%)	1															
	bii	25000(m)	1															
	biii	1500 (m)	1															
	c	- the shorter the race, (100 & 800m / up to 1500), the lower the proportion of aerobic respiration / the higher the proportion of anaerobic respiration carried out - the longer the race, (more than 1500/ 10000 – 25000m) the higher the proportion of aerobic respiration / the lower the proportion of anaerobic respiration carried out or when the distance of race increases from 100m to 2500m, the energy provided by aerobic respiration increases from 8% to 96% or when the distance of race increases from 100m to 25000m, the energy provided by anaerobic respiration decreases from 92% to 4% - for distance of 1500m, proportion of aerobic and anaerobic respiration is used equally in providing energy Any 2	2															
Total			7															

5	a	Uterine lining / endometrium	1
		<i>R uterus wall</i>	
	bi	Day 11 to 17	1
	bii	Day 19 to 25	1
		<i>Implantation must come after fertilization</i>	
	c	- bloods might be of <u>different groups</u> and <u>agglutination</u> may occur if mixing of blood occurs <u>mother's blood pressure too great</u> and might damage foetal tissues <u>mother's blood may have bacteria or virus</u> that may harm the foetus Any 2	2
	di	below 32 °C (Accept correct stated range < 32°C)	2

		/ 29°C <x<32°C above 35 °C (Accept correct stated range >35°C) / between 36°C and 38°C No marks to be awarded if no units given	
	dii	- Human : not dependent on external temperature/develops at constant temperature ; - Human : sex of child inherited/determined at fertilisation - Human : develops in uterus and not inside the egg Any 2	2
Total			9

Section C - Free Response (30 marks)

6	a	Axis labelled correctly with units Scale appropriate / graph size more than ½ of grid Points correctly plotted Best fit	1 1 1 1
	bi	horizontal line at 180 mg per 100 cm ³	1
	bii	60 to 240 minutes	1
	biii	increases after time when glucose is ingested, decreases, but stays below or touches 180 mg per 100 cm ³	1
	c	insulin secreted / produced / released by pancreas glucose absorbed by liver / permeability of liver cell membranes increases, increasing rate of glucose uptake insulin causes / stimulates liver to convert excess glucose into glycogen for storage	1 1 1
Total			10

7	ai alii	- Digestion is the process whereby large complex, insoluble food molecules are broken down / hydrolysed into simpler, soluble and diffusible molecules that can be absorbed into the body cells. - There are two types of digestion, chemical digestion where it involves breaking down chemical bonds within the molecules and also physical digestion where it involves breaking up the molecules physically with the help of enzymes - Absorption is the process whereby digested food substances are absorbed into the bloodstream through walls of the ileum by the processes of diffusion and active transport. - The absorbed food substances then diffuse into the cells for various activities like metabolism and assimilation.	3
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		Any 3	
	bi	stomach produce acidic gastric juice; kill bacteria	1 1
	bii	Without stomach, a person is unable to digest <u>protein into polypeptide</u> as efficiently as a normal person. The person will need to consume food with <u>less protein</u> Food usually remains in stomach for 3 to 4 hrs to form chyme, so the person will need to take <u>more frequent meals</u> and <u>lesser amount of food per meal</u> . the person will <u>be more prone to infection of the gut</u> as bacteria are not killed by stomach.	1 1 1 1
Total			10

8 Either			
	a	• Oxygen molecule from air in lungs dissolves in the thin film of moisture on the cells lining the alveolus; • Diffuses across the one-cell thick alveolus wall and through one-cell thick capillary wall into blood stream • Combine with haemoglobin in red blood cells to form oxyhaemoglobin • Transported from lungs to the heart via pulmonary vein • Oxygenated blood pumped out of heart via aorta and transported to muscle • Oxygen diffuses across capillary wall and into muscle cell	4
	b	Any 4 During the race, <u>anaerobic respiration</u> occurs. <u>Lactic acid</u> is built up. After exercise, oxygen taken in used to <u>oxidise lactic acid to glucose</u>	1 1 1
	c	Carbon monoxide <u>combines irreversibly with haemoglobin</u> to form carboxyhaemoglobin Haemoglobin will <u>not be able to combine with oxygen</u> Concentration of oxygen carried in red blood cells <u>reduced</u>	1 1 1
Total			10

8	Or		
	a	Arteries have thicker, more muscular walls, more elastic tissues • Arteries carry blood out of heart and wall is able to withstand higher blood pressure from the heart • Able to stretch and recoil and help to push blood along / maintain constant flow Any 1 Presence of semi-lunar valves in veins Prevents backflow of blood back to the heart / ensure blood flows in one direction as blood pressure is low	1 1 1 1
	b	Dissolved food substances eg <u>glucose and amino acids</u> and <u>oxygen</u> <u>diffuse</u> from the blood capillaries into the tissue fluid Metabolic waste products eg <u>urea, carbon dioxide</u> <u>diffuse</u> from the tissue fluid into the blood capillary A reference to diffusing across <u>partially permeable membrane</u> of the cells in blood capillary wall	1 1 1
	c	Blockage of coronary arteries and blood supply to the heart muscles greatly reduced / stop Heart muscle does not receive sufficient oxygen and nutrients and dies Cause : • Diet rich in cholesterol and saturated animal fats • Emotional stress • Smoking Any 1	1 1 1
		Total	10