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|       |           |              |
|-------|-----------|--------------|
| Class | Full Name | Index Number |
|-------|-----------|--------------|



*I believe, therefore I am*

## Mid Year Examination 2016

# O

### SCIENCE (CHEMISTRY)

Secondary 1 Express

2 hours

2 booklets

12 May 2016

Additional Material: Optical Answer Sheet(OTAS)

### READ THESE INSTRUCTIONS FIRST

Write your name and index number on all 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.

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

#### Section A

There are ten questions in this section. 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 answer on the **OTAS (No. 21-30)**.

#### Section B

Answer **all** questions in the spaces provided.

#### Section C

Answer **all** questions in the spaces provided.

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

At the end of the examination, fasten all your work securely together.

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

The total number of marks for this paper is **40**.

You should not spend more than **45 minutes** for this paper.

**DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO.**

| For Examiner's Use |  |
|--------------------|--|
| Section A          |  |
| Section B          |  |
| Section C          |  |
| Total              |  |

This document consists of **14** printed pages.

Setter: Mrs Chew Shi Hui

### Not to be completed during course of exam

This page will be completed under supervision of your subject teacher when reviewing the paper

#### Analysis of my Mid-Year Examination Paper

1) In order of rank from 1 (most) to 5 (least), the reasons for lost marks in this paper are:

|             | <b>Deciphering question</b>                                                                | <b>Subject Proficiency</b>                                                                   | <b>Time Management</b>                                                                    | <b>Carelessness</b>                                                                   | <b>Examination Strategies</b>                                                                   |
|-------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|             | <i>Inadequate understanding of questions and not knowing fully what questions require.</i> | <i>Lack of deep understanding of concepts and thus not able to apply concepts correctly.</i> | <i>Not able to complete all parts of paper. Answers were also not thoroughly checked.</i> | <i>Losing marks unnecessarily ie missing units, transferred answers inaccurately.</i> | <i>Little or no pre-determined plan on how to approach the paper in the most effective way.</i> |
| <b>Rank</b> |                                                                                            |                                                                                              |                                                                                           |                                                                                       |                                                                                                 |

2) Identify instances related to items ranked 1 & 2 above:

| <b>Rank</b> | <b>Short description of instances</b> |
|-------------|---------------------------------------|
| <b>1</b>    |                                       |
| <b>2</b>    |                                       |

3) In preparation for the next test / examination, I would do the following:

|  |
|--|
|  |
|--|

\_\_\_\_\_  
Name, Class & Signature of Student

\_\_\_\_\_  
Acknowledged by Subject Teacher

[Turn over

## Section A

Answer all questions.

The total mark for this section is 10.

Choose the one you consider correct and record your answer on the OTAS (No. 21-30).

- 21 Read the excerpt taken from *Murder by Poison: A Casebook of Historic British Murders* by Nicola Sly, as shown below.

*Murder by Poison*

Edith Annie Berry died at five o'clock on the morning of 4 January 1887, aged eleven years and eight months. 'I shall want a certificate of death,' Elizabeth told Dr Patterson, who was somewhat unsure of what to record as the cause of death. He asked Elizabeth's permission to carry out a post-mortem examination on her daughter and Elizabeth consented. When Patterson asked if Annie were insured, Elizabeth told him that she wasn't and that all the funeral expenses would have to come out of her pocket.

A post-mortem examination was carried out but although the child's organs were tested, no trace of any poison could be found and, aside from the blister on her lips, some whitening of her mouth and gums and some reddening, bleeding and slight corrosion of her intestines and stomach lining, there was very little to indicate what had caused Annie's death. No natural explanation presented itself and the doctors eventually concluded that Annie had died from drinking a corrosive, irritant poison, which had been ejected from her body by her constant vomiting. Although no trace of it was found in Annie's body, it was thought that sulphuric acid was the most likely culprit.

Which of the following hazard warning symbols would **not** be labelled on the bottle in which Annie died from drinking?

A



B



C



D



[Turn over

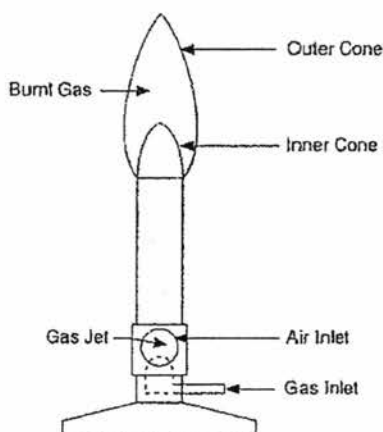
- 22 The following statement is written by a student who is carrying out the scientific method.

*"The experimental data shows that the higher the temperature, the faster the sugar dissolves in water."*

Which of the following shows the stage at which the student is carrying out?

- |   |                       |   |                      |
|---|-----------------------|---|----------------------|
| A | Making a hypothesis   | B | Drawing a conclusion |
| C | Making an observation | D | Doing an experiment  |

- 23 The diagram below shows a Bunsen flame.

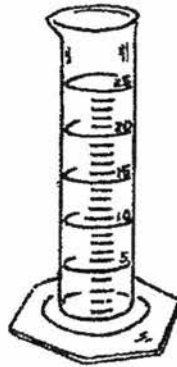


Which of the following is correct?

|   |                                          | Luminous Flame | Non-luminous Flame |
|---|------------------------------------------|----------------|--------------------|
| A | Steadiness of flame                      | Steady         | Unsteady           |
| B | Flame is produced when air hole is ..... | Closed         | Open               |
| C | Colour of outer cone                     | Blue           | Orange             |
| D | Is soot produced?                        | No             | Yes                |

[Turn over

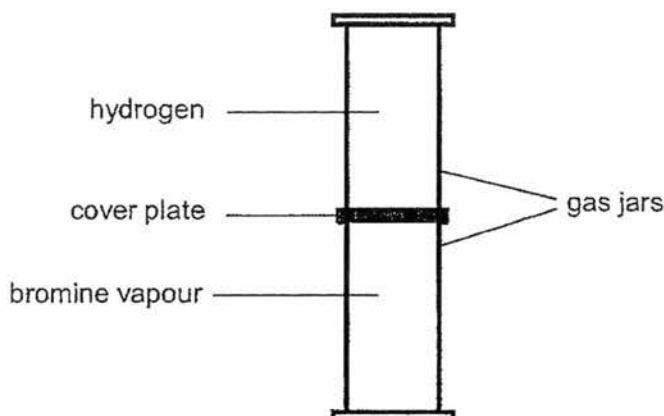
- 24 Below is a 3-D drawing done by a student from Bowen Artist. What is the apparatus best used for?



- A Mixing chemicals in it
  - B Measuring the volume of liquid
  - C Evaporating a liquid from a solution
  - D Separating different types of liquids
- 25 An inflated balloon will shrink if placed in a refrigerator. Why is this so?
- A The gas particles move slower and become further apart.
  - B The gas particles move slower and become closer together.
  - C The gas particles move faster and become closer together.
  - D The gas particles move faster and become further apart.

[Turn over

- 26 A gas jar full of hydrogen was placed over a gas jar full of brown bromine vapour. The cover-plate was removed from the gas jars. After some days, the colour of the gas in both jars was the same.

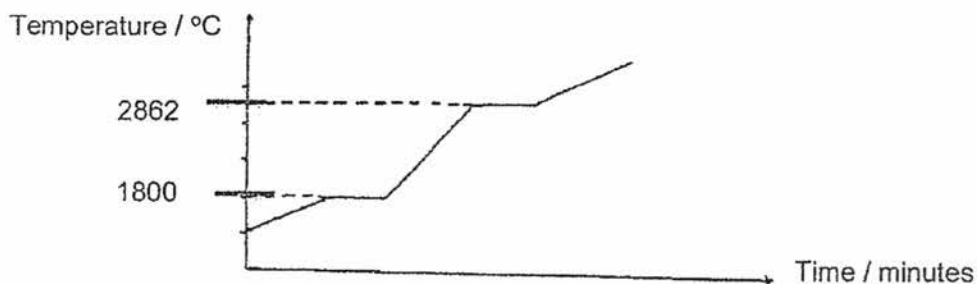


Which statement correctly explains this change?

- A Bromine and hydrogen molecules did not diffuse.
  - B Hydrogen and bromine vapour have the same density.
  - C Bromine molecules move more quickly than hydrogen.
  - D Hydrogen and bromine molecules move randomly and diffuse.
- 27 Which statement about the behavior of the particles in a gas is **incorrect**?
- A They spread throughout the vessel in which they are contained.
  - B There are large spaces between the particles.
  - C They are able to move at high speeds.
  - D They are arranged in regular patterns.
- 28 Which of the following best explains why Nathan gets burnt and scalded when steam touches his hand?
- A Boiling has occurred in steam and takes in heat from Nathan's hand.
  - B Evaporation has occurred in steam and takes in heat from Nathan's hand.
  - C Condensation of steam happened on his hand and gives out heat to Nathan's hand.
  - D Both boiling and evaporation has occurred on his hand and gives out heat to Nathan's hand.

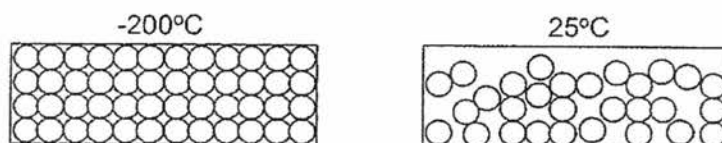
[Turn over

- 29 A solid Z was heated steadily in a pot. Its temperature varied as shown in the graph below. Zann needs to make a solid spoon to scoop some liquid Z from the pot into another container. The table below shows the melting point of some substances. Which substance below is most suitable to make the spoon?



|   | Melting Point/°C | Substance       |
|---|------------------|-----------------|
| A | 3410             | Tungsten        |
| B | 2000             | Aluminium Oxide |
| C | 1710             | Silicon dioxide |
| D | 1064             | Gold            |

- 30 The diagram shows the arrangement of the particles in a substance at two different temperatures.



Which of the following substances could the diagrams represent?

| Substance | Melting point / °C | Boiling point / °C |
|-----------|--------------------|--------------------|
| A         | -110               | 20                 |
| B         | -150               | 50                 |
| C         | -450               | -300               |
| D         | -550               | 0                  |

[Turn over

**Section B**

Answer **all** the questions in this section in the spaces provided.  
The total mark for this section is 20.

- B1 (a)** The following sentences describe steps to light a Bunsen burner to get a non-luminous flame. Place the numbers 1 to 4 in the boxes to show the correct sequence of the steps. [1]

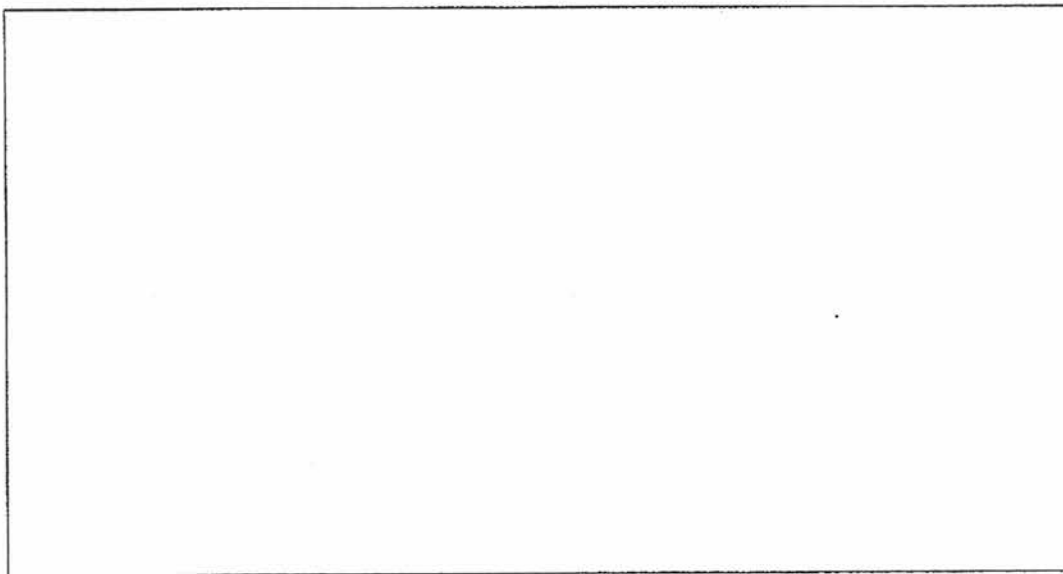
- 5    Open the air-hole
- .... Ignite the Bunsen burner with the lighter
- .... Turn on the gas tap
- .... Close the air-hole
- .... Hold the lighter near the top of the barrel

- (b)** Firstly, Mrs Chew tasked Siva to perform an experiment in the laboratory according to the following steps.

Step 1: Measure  $75\text{cm}^3$  of water using a measuring cylinder and transfer it to a beaker.

Step 2: Measure  $10\text{ cm}^3$  of water using a measuring cylinder and transfer it to an evaporating dish.

Draw a labeled 2-D diagram of the experimental set-up of step 2, including the transferring of water. [2]



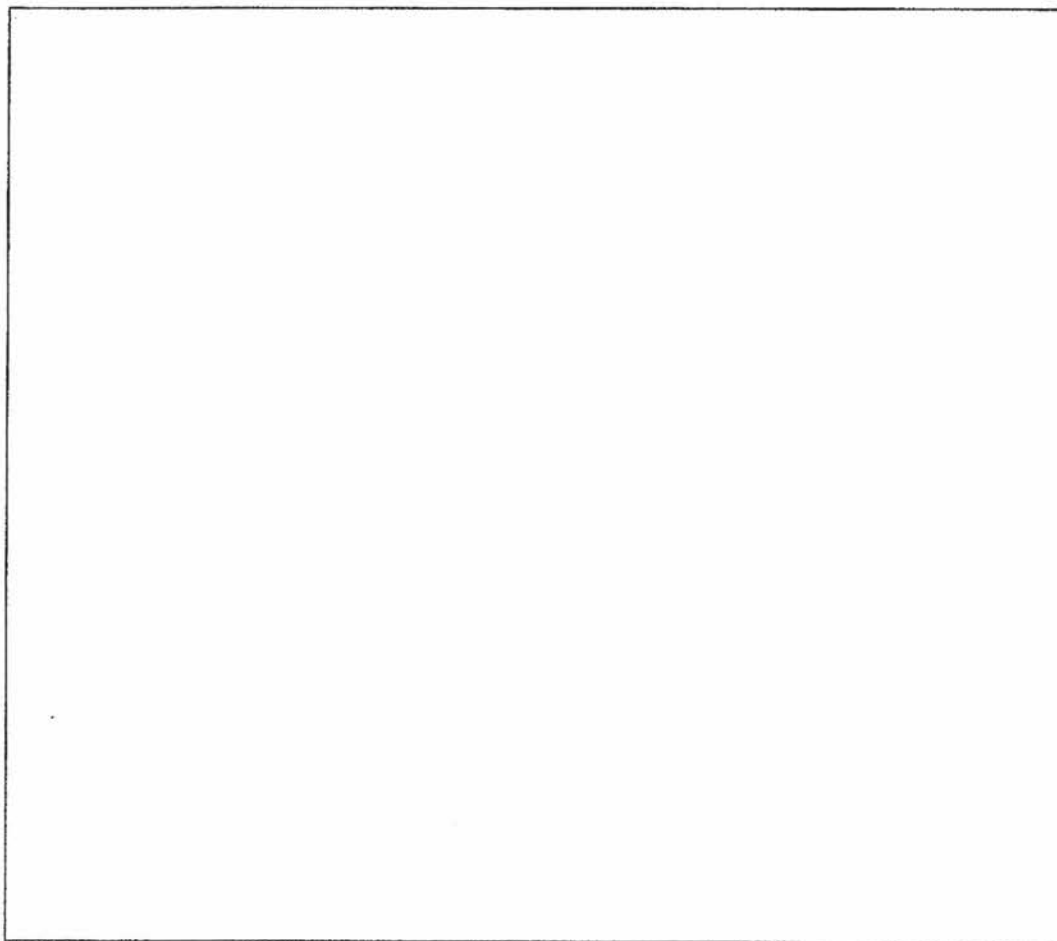
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Examiner's  
Use

[Turn over

Step 3: Place the beaker of water over a tripod stand.

Step 4: Next, place the evaporating dish on top of the beaker of water for heating, using a Bunsen burner.

In the space provided below, draw a labeled 2D diagram of this experimental set-up as describe in step 3 and 4, including the Bunsen burner. [4]



- (c) State one laboratory safety rule a student should follow when heating a test tube of solution using a Bunsen burner.

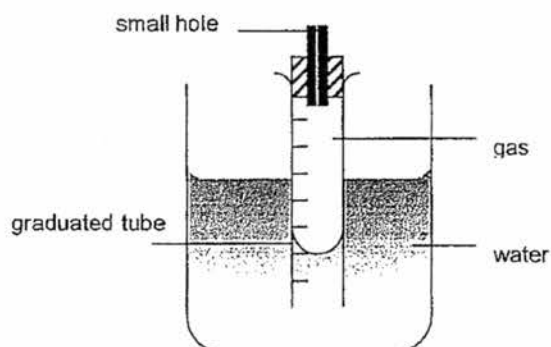
.....  
.....[1]

[Total: 8]

[Turn over

- B2** The diagram below shows the apparatus for measuring the rate of diffusion of gases through a small hole.

For  
Examiner's  
Use



The times taken for  $100 \text{ cm}^3$  of some gases which has different masses to diffuse through the small hole in this apparatus, at room conditions, are given in the table.

| type of gas     | relative mass of gas | time for diffusion of $100 \text{ cm}^3$ of gas / s |
|-----------------|----------------------|-----------------------------------------------------|
| argon           | 40                   | ?                                                   |
| carbon monoxide | 28                   | 106                                                 |
| carbon dioxide  | 44                   | 133                                                 |
| methane         | 16                   | 80                                                  |
| nitrogen        | ?                    | 106                                                 |

- (a) Suggest a possible hypothesis for this experiment.

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

[Turn over

(b) Identify the following variables:

Independent variable

.....[1]

Dependent variable

.....[1]

Controlled variable

.....[1]

(c)(i) Deduce the time taken time for 100 cm<sup>3</sup> of argon gas to diffuse.

.....[1]

(c)(ii) Deduce the relative mass of nitrogen gas.

.....[1]

(d) Some properties of ammonia gas are given in the table below.

|                            |                  |
|----------------------------|------------------|
| melting point              | -78°C            |
| boiling point              | -33°C            |
| density compared with air  | lighter than air |
| Can gas dissolve in water? | Yes              |

Suggest why the apparatus would be unsuitable for finding the rate of diffusion of ammonia gas.

.....[1]

(e) As the carbon monoxide gas is poisonous, suggest one precaution to take when handling this gas in the laboratory.

.....[1]

[Turn over

- (f) Why do all these gases take the shape of the syringe in the graduated tube?

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Use

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

[Total: 10]

- B3** Read an excerpt from the article below and answer the question that follows:

A single-celled organism could end the use of harmful chemicals to extract precious metals from electronic waste (e-waste). Scientists from the National University of Singapore (NUS) have re-engineered the *Chromobacterium violaceum* bacterium to give it the ability to create enzymes that can recycle metals such as gold, platinum and palladium from e-waste. This means barrels of poisonous chemicals such as cyanide or concentrated acids - now often used to dissolve metals in e-waste before they are recovered through electrolysis - could one day be replaced with pools of this common soil bacterium. When immersed in the bacteria, the metals are dissolved and then converted into solids without the need for electrolysis. This method is safer and more environmentally sustainable, said Associate Professor Yew Wen Shan, who leads the NUS research.

(excerpt taken from: <http://www.straitstimes.com/singapore/environment/bacteria-used-to-extract-precious-metals-from-e-waste-in-nus-study> April 08, 2016)

- (a) State the benefit of science and technology as stated in the article above.

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

- (b) State a harmful use of science and technology as stated in the article above.

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

[Total: 2]

[Turn over

## Section C

Answer **all** the questions in this section in the spaces provided.  
The total mark for this section is 10.

- C4** Nitric acid plays a significant role in the manufacture of various products such as dyes, perfumes and drugs. The melting point of nitric acid is  $-42^{\circ}\text{C}$ . The heating curve of nitric acid is shown in Figure 1.

Sulfuric acid is a widely used chemical in the world. It is often used in the production of fertilizers and as an industrial catalyst. The boiling point of sulfuric acid is  $330^{\circ}\text{C}$ . The cooling curve of sulfuric acid is shown in Figure 2.

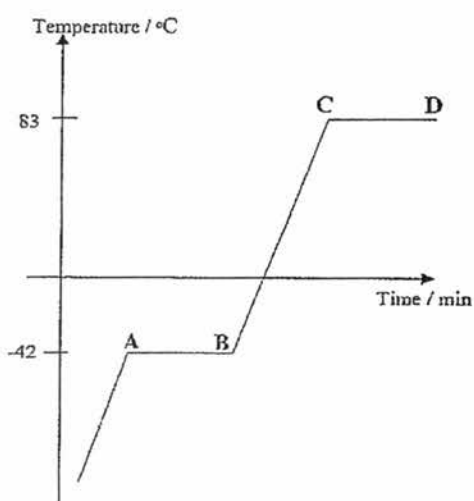


Figure 1: Heating curve of nitric acid

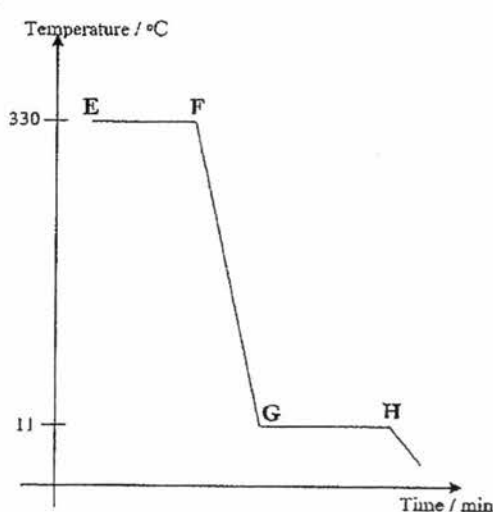


Figure 2: Cooling curve of sulfuric acid

- (a) From Figure 1, infer the physical state of nitric acid at room temperature ( $25^{\circ}\text{C}$ ).

.....[1]

- (b) Based on your answer in 4(a), describe the arrangement and movement of the particles in nitric acid at room temperature of  $25^{\circ}\text{C}$ .

Arrangement:.....

.....

Movement:.....

.....[2]

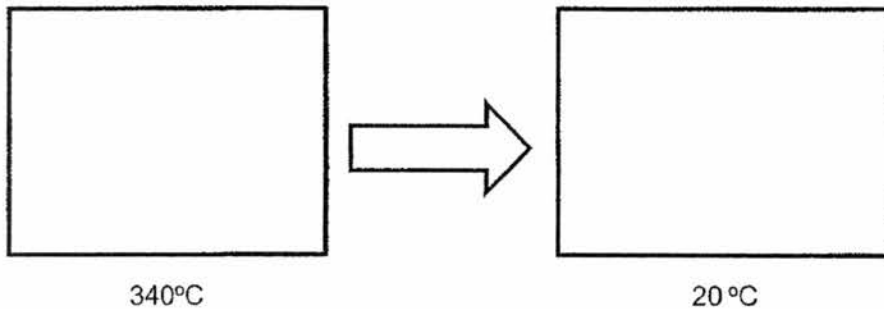
- (c) From Figure 2, infer the physical states of sulfuric acid at Section GH.

.....[1]

For  
Examiner's  
Use

[Turn over

- (d) Based on the Particulate Nature of Matter, draw the initial and final arrangement of particles when sulfuric acid changes state from  $340^{\circ}\text{C}$  to  $20^{\circ}\text{C}$ . [2]  
(particles should be of  size at least)



- (e) Name the process responsible for the change of state that occurs from **C** to **D**.  
.....[1]

- (f) Explain using the Particulate Nature of Matter,

(i) why does the temperature remain constant from **C** to **D** in Figure 1?

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

(ii) why gases can be compressed?

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

End of Paper

[Total: 10]

|       |           |              |
|-------|-----------|--------------|
| Class | Full Name | Index Number |
|-------|-----------|--------------|



*I believe, therefore I am*

## Mid Year Examination 2016

# O

**SCIENCE (Biology)**  
Secondary 1 Express

**12 May 2016**

**2 hour  
2 booklets**

### READ THESE INSTRUCTIONS FIRST

Write your name and index number on all 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.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

#### Section A

There are **twenty** questions in this section. 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 answer on the OTAS (No. 1-20)

#### Section B

Answer **all** questions in the spaces provided.

#### Section C

Answer **all** questions in the spaces provided.

In calculations, you should show all steps in your working, giving your answer at each stage.  
At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.  
The total number of marks for this paper is **60**.  
**You should not spend more than 1 hour 15 minutes for this paper.**

**DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO.**

| For Examiner's Use |  |
|--------------------|--|
| Section A          |  |
| Section B          |  |
| Section C          |  |
| Total              |  |

This document consists of **18** printed pages.

Setter: Mrs Marlina Azlan

### Not to be completed during course of test / exam

This page will be completed under supervision of your subject teacher when reviewing the paper

#### Analysis of my Test / Examination Paper

1) In order of rank from 1 (most) to 5 (least), the reasons for lost marks in this paper are:

|             | <b>Deciphering question</b>                                                                | <b>Subject Proficiency</b>                                                                   | <b>Time Management</b>                                                                    | <b>Carelessness</b>                                                                   | <b>Examination Strategies</b>                                                                   |
|-------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|             | <i>Inadequate understanding of questions and not knowing fully what questions require.</i> | <i>Lack of deep understanding of concepts and thus not able to apply concepts correctly.</i> | <i>Not able to complete all parts of paper. Answers were also not thoroughly checked.</i> | <i>Losing marks unnecessarily ie missing units, transferred answers inaccurately.</i> | <i>Little or no pre-determined plan on how to approach the paper in the most effective way.</i> |
| <b>Rank</b> |                                                                                            |                                                                                              |                                                                                           |                                                                                       |                                                                                                 |

2) Identify instances related to items ranked 1 & 2 above:

| <b>Rank</b> | <b>Short description of instances</b> |
|-------------|---------------------------------------|
| <b>1</b>    |                                       |
| <b>2</b>    |                                       |

3) In preparation for the next test / examination, I would do the following:

|  |
|--|
|  |
|--|

\_\_\_\_\_  
Name, Class & Signature of Student

\_\_\_\_\_  
Acknowledged by Subject Teacher

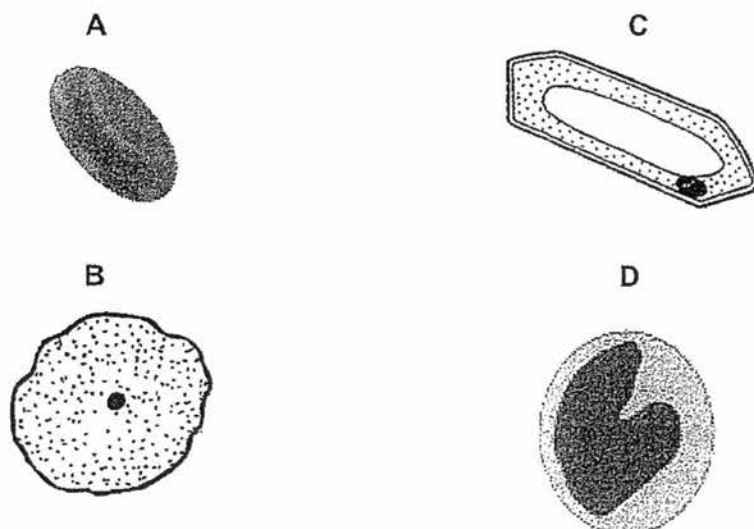
[Turn over

**Section A**Answer **all** questions.

The total mark for this section is 20.

Choose the one you consider correct and record your answer on the OTAS (No. 1-20)

- 1 Four different cells were seen through a microscope.  
Which of the following cells will have the shortest life span?



- 2 Which of the following organs are parts of the nervous system?

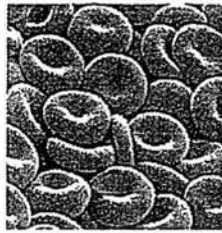
- A Heart and blood vessels
- B Trachea and bronchi
- C Stomach and mouth
- D Brain and spinal cord

[Turn over

- 3 After digestion, glucose is being absorbed into the bloodstream and delivered to the body cells.  
Which of the following organelles is responsible for utilizing glucose and provide energy to the cells?
- A Vacuoles
  - B Nucleus
  - C Mitochondrion
  - D Cytoplasm
- 4 Which of the following is true for both red blood cells and root hair cells?
- A Large surface area to volume ratio
  - B No nucleus
  - C No cytoplasm
  - D Thickened cell wall
- 5 What is the benefit of having division of labour in a multicellular living organism?
- A It reduces the energy requirement in a multicellular living organism.
  - B It reduces the waste products produced in a multicellular living organism.
  - C It enables efficient functioning of the processes in a multicellular living organism.
  - D It enables the multicellular living organisms to defend bacteria and viruses better.
- 6 Which of the following statements is **false** about the cell wall?
- A It is a thick layer surrounding the cell membrane.
  - B It is a partially permeable membrane.
  - C It is made up of cellulose.
  - D It supports the cell and gives it a regular shape.

[Turn over

- 7 The diagram below shows cells that are found in the human body.

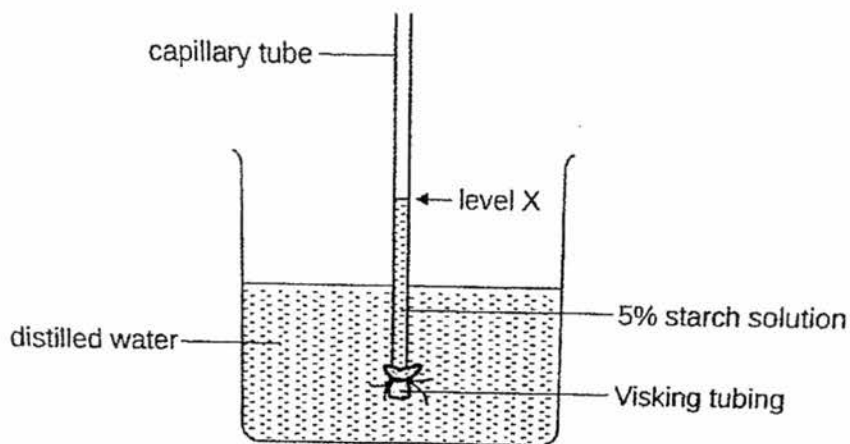


Which of the following is true about the cells?

- A The cells belong to the human respiratory system.
  - B The cells are biconcave so that more oxygen will be transported by them.
  - C The cells are able to reproduce themselves or repair the worn-out parts.
  - D The cells help to transmit signals around the human body.
- 8 Which of the following substances are able to move in and out of the living cells by diffusion?
- I Oxygen
  - II Glucose
  - III Carbon dioxide
  - IV Water
- A I, II and IV
  - B I, III and IV
  - C I, II and III
  - D I, II, III and IV
- 9 Which of the following is an example of diffusion in a plant?
- A Mineral salts move into the root hair cells with the use of energy.
  - B Water is absorbed into the plant through the root hair cells.
  - C Carbon dioxide moves into the leaf through stomata from the atmosphere.
  - D Water moves up the xylem from the root hair cells during photosynthesis.

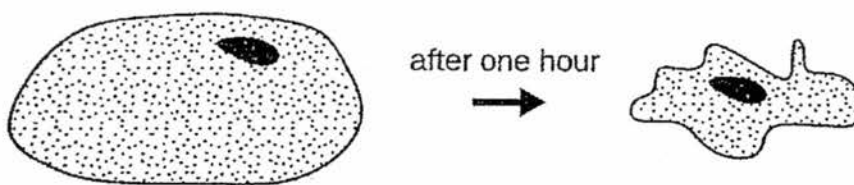
[Turn over

- 10 The diagram shows an experiment setup.



Which of the following will **not** take place in this experiment after a period of time?

- A Level X in the capillary tube increases.
  - B Water level in distilled water decreases.
  - C Starch solution is only found in the Visking tubing.
  - D Diffusion of starch take place in the Visking tubing.
- 11 The diagram shows the appearance of an animal cell after being placed in a solution for an hour.

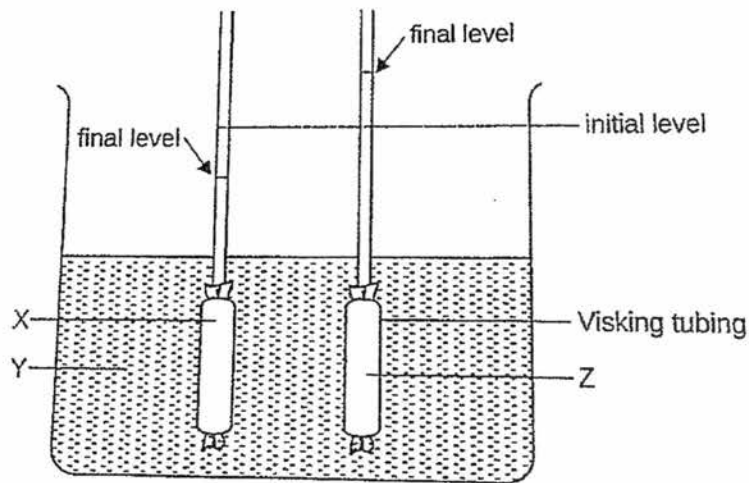


Which of the following statements is **false**?

- A Osmosis has taken place.
- B It is placed in a dilute solution.
- C The cell decreases in size.
- D The cell loses mass.

[Turn over

- 12 The diagram shows an experiment using three different solutions, X, Y and Z.



From the results of the experiment, what are likely the concentration of solutions X, Y and Z?

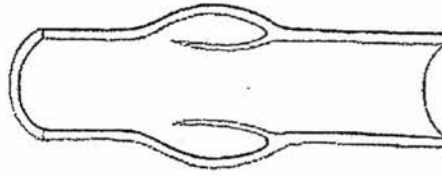
|   | X                    | Y                    | Z                    |
|---|----------------------|----------------------|----------------------|
| A | 15% sucrose solution | 10% sucrose solution | 5% sucrose solution  |
| B | 5% sucrose solution  | 10% sucrose solution | 15% sucrose solution |
| C | 15% sucrose solution | 5% sucrose solution  | 10% sucrose solution |
| D | 10% sucrose solution | 15% sucrose solution | 5% sucrose solution  |

- 13 Which of the statement explains why humans are said to have a double circulation?

- A As blood circulates, it passes twice through the heart.
- B Each side of the heart has two chambers.
- C Each side of the heart has two valves
- D There are two different sets of arteries leaving the heart.

[Turn over

- 14 The diagram shows a valve in a section through a blood vessel.



What is the function of the valve present in this blood vessel?

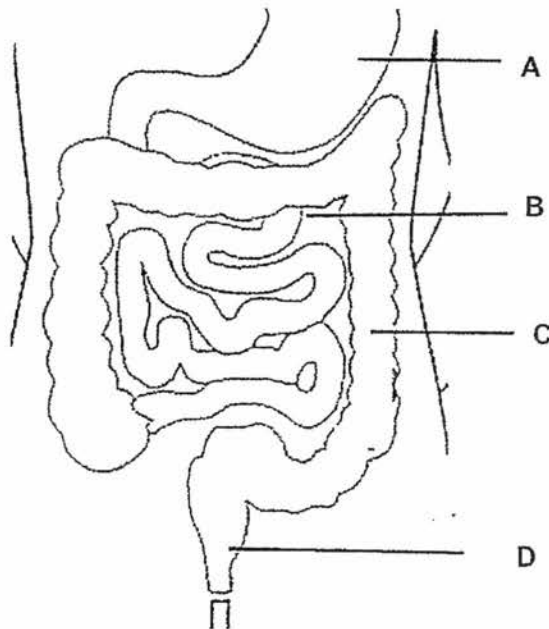
- A Increase the blood pressure of blood that is flowing in this blood vessel so that blood can be returned back to the lungs.
  - B The valve is always forced open to transport blood to the heart from the lungs.
  - C The elastic wall causes the valve to close between heartbeats hence allowing exchange of materials in this blood vessel.
  - D Valve help the return of blood to the heart by opening and closing whenever there is tendency of blood flowing backward.
- 15 Someone suffering from dengue fever will have a reduced platelet count. This means .....
- A small breaks in the capillaries will not clot.
  - B bacteria in blood will be destroyed more rapidly by the white blood cells.
  - C the person will also suffer from sickle cell anaemia.
  - D the cells of the body are not able to receive enough nutrients.
- 16 Cholesterol plaque is formed by the accumulation of cholesterol on the wall of arteries. Which of the following is the reason why a heart attack may occur if the coronary artery is blocked by cholesterol plaque?
- A The rate of heartbeat increases.
  - B Less blood is pumped out from the heart.
  - C The heart muscle breaks down.
  - D Less oxygenated blood is supplied to the heart muscle.

[Turn over

- 17 Which enzyme will digest peanut oil in the digestive system and what are the products?

|   | Enzyme   | Products                 |
|---|----------|--------------------------|
| A | Lipase   | Amino acids              |
| B | Lipase   | Fatty acids and glycerol |
| C | Protease | Amino acids              |
| D | Protease | Fatty acids and glycerol |

- 18 The diagram shows part of the human digestive system.  
In which part of the digestive system does the chemical digestion of proteins begin?



[Turn over

19 A person who has had his gall bladder removed must control his fat intake because .....

- A he is now more allergic to fats.
- B bile is not produced to digest fats.
- C emulsification of fats will be reduced.
- D no more lipases are produced to digest fats.

20 Which of the following shows the location where physical digestion of food takes place in the human digestive system?

- I Mouth
- II Stomach
- III Small intestine
- IV Large intestine

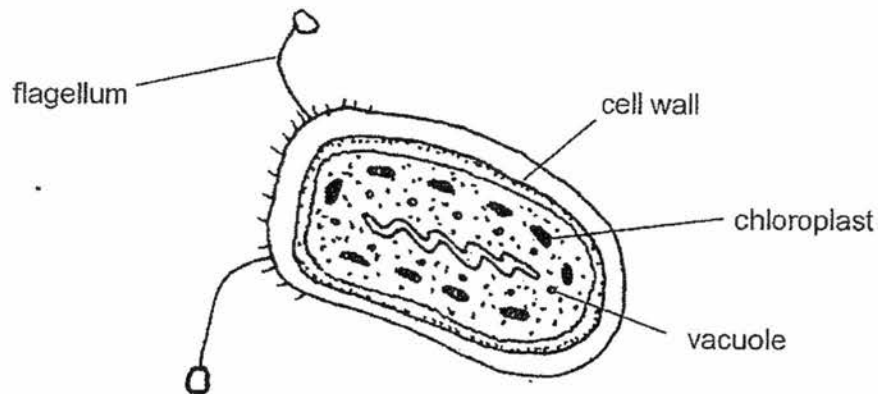
- A I and II
- B I, II and III
- C II and III
- D I, II, III and IV

[Turn over

## Section B

Answer **all** the questions in this section in the spaces provided.  
The total mark for this section is 20.

**B1** Scientists found the cell shown in **Fig 1.1** on a remote planet.



**Fig 1.1**

Based on your knowledge on cells, state whether this cell originate from a plant or an animal or both. Explain your answer.

.....

.....

.....

.....

.....

.....[4]

[Total: 4]

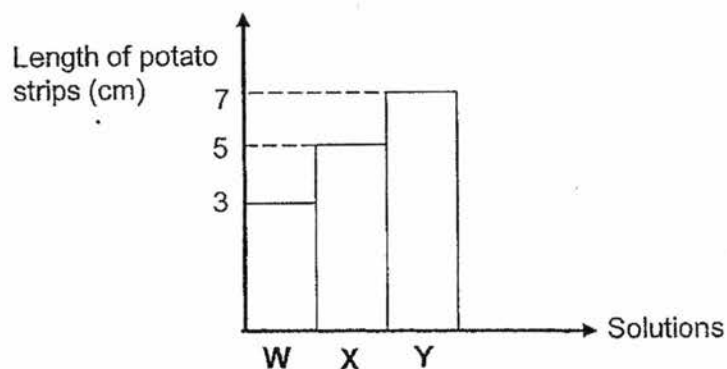
For  
Examiner's  
Use

[Turn over

- B2** In an experiment, Kenneth immersed three identical potato strips with the length of 5cm into three different concentration of sugar solution (10%, 20% and 30%) respectively.

For  
Examiner's  
Use

The changes in the length of the potato strips were recorded after one hour. The results were presented in **graph 1** below.



**Graph 1**

- (a) Which of the solutions would best represent the 30% sugar solution?

Explain your answer by relating to the change in length of the potato strip.

.....

.....

.....

.....

.....

.....[4]

[Turn over

- (b) Which of the solutions would have the same concentration as the cell sap of the potato?

Explain your answer.

.....

.....

.....

.....[3]

[Total: 7]

- B3 Fig 3.1 shows a human heart.

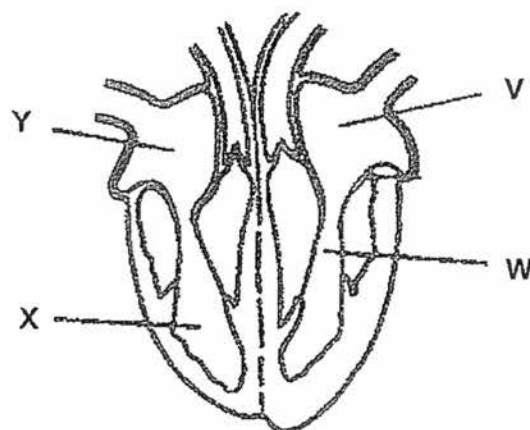


Fig 3.1

- (a) Using the letters provided in the diagram, (V, W, X & Y), state the part(s) which receives oxygenated blood from the lungs.

.....[1]

- (b) Explain why the wall of the chamber marked W have a thicker muscle than the walls of the other chambers of the heart.

.....

.....

.....[2]

[Turn over]

- (c) In a normal heart, a thick wall muscle separates the left and right sides of the heart. Suggest what would happen if there is a small hole or opening in this muscle.

.....

.....

.....[2]

[Total: 5]

- B4 Fig 4.1 shows a villus found in the small intestine.

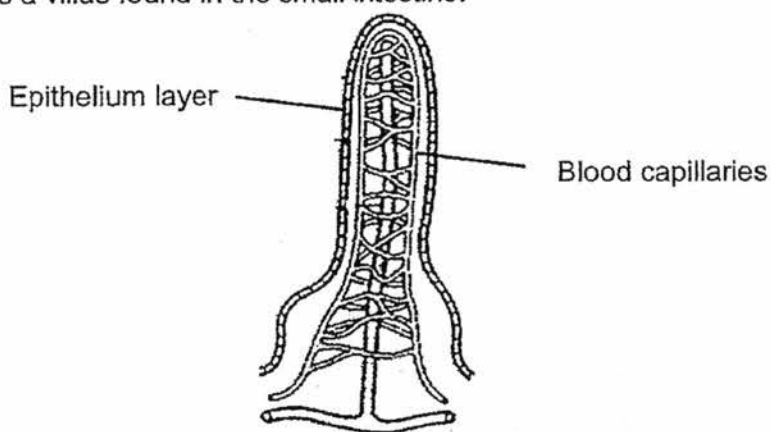


Fig 4.1

Describe **two** features of the small intestine and how these features are adapted for its function in absorption.

.....

.....

.....

.....

.....

.....

.....[4]

[Total: 4]

[Turn over]

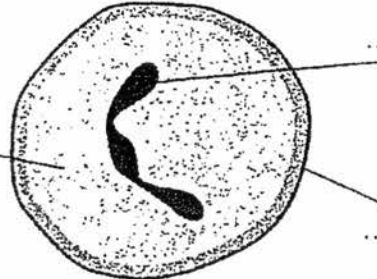
**Section C**

Answer **all** the questions in this section in the spaces provided.  
The total mark for this section is 20.

- C5 (a)** Fig 5.1 shows one type of white blood cell. Complete the labels on the diagram. [3]

For  
Examiner's  
Use

Fig 5.1



- (b)** Describe how the appearance and structure of a red blood cell differ from that of a white blood cell.

.....

.....

.....[2]

- (c)** Explain the advantage of each of the following

- (i)** Red blood cells have no nuclei.

.....

.....[1]

- (ii)** Veins have valves.

.....

.....[1]

- (iii)** Capillary walls are only one cell thick.

.....

.....[1]

[Turn over

(d) Explain why the walls of arteries are much thicker than those of veins.

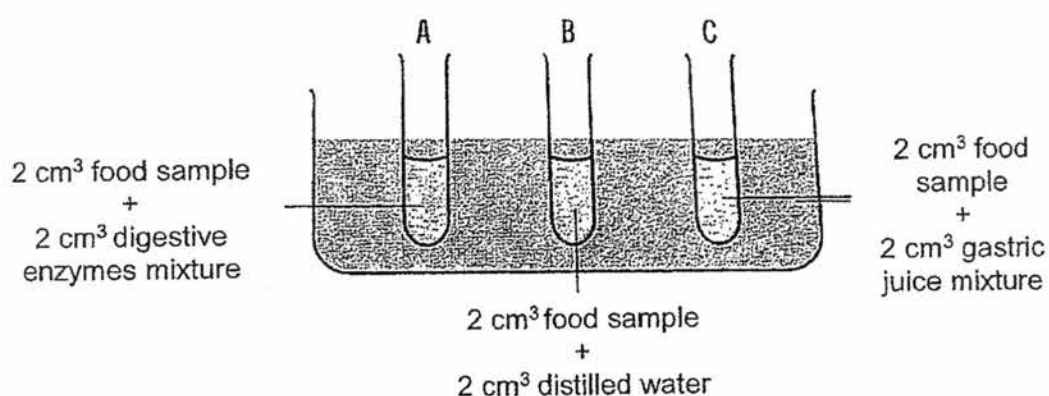
.....

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.....[2]

[Total: 10]

- C6** Fig 6.1 shows an experiment to determine the presence of digestive enzymes and their effects on a food sample. The food sample was treated with digestive enzyme mixture (test tube A), distilled water (test tube B) and gastric juice mixture (test tube C)



**Fig 6.1**

Before the treatment, 1 cm<sup>3</sup> of food sample from each test tube was extracted to go through the food test.

30 minutes after the treatment, another food test was done on the content of the test tube A, B and C.

[Turn over

Table 6.3 shows the results.

For  
Examiner's  
Use

|                        | Test tube A |               |                       | Test tube B |               |                 |
|------------------------|-------------|---------------|-----------------------|-------------|---------------|-----------------|
|                        | Iodine test | Biuret's test | Benedict's test       | Iodine test | Biuret's test | Benedict's test |
| Before treatment       | Blue-black  | Purple        | Blue                  | Brown       | Purple        | Blue            |
| 30 min after treatment | Brown       | Blue          | Brick-red precipitate | Brown       | Purple        | Blue            |

Table 6.3

- (a) What can you conclude about the content of the digestive enzyme mixture in test tube A.

Explain your answer.

.....

.....

.....

.....[2]

- (b) Predict the results of the 3 food test in test tube C 30 minutes after the treatment. Explain your answer.

.....

.....

.....

.....[2]

- (c) What is the function of test tube B?

.....[1]

[Turn over

Describe how digestion of the nutrients in test tube A take place in the small intestine. Include in your answer the enzymes involved and the end-products of the digestion.

[5]

**-End of Paper-**

[Turn over

### Marking Scheme

Level : Sec 1Express  
 Subject : Science Biology  
 Examination : CT 2016

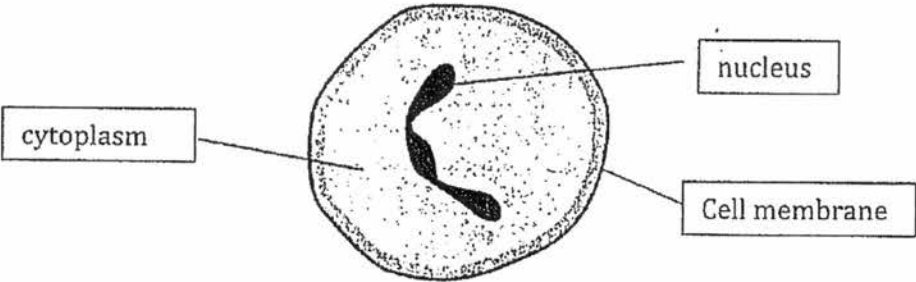
### Section A (5 marks)

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. A  | 2. D  | 3. C  | 4. A  | 5. C  |
| 6. B  | 7. B  | 8. C  | 9. C  | 10. D |
| 11. B | 12. B | 13. A | 14. D | 15. A |
| 16. D | 17. B | 18. A | 19. C | 20. B |

### Section B (20 marks)

| Question No | Answer                                                                                                                                                                                                                                                                                     | Remarks |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| B1          | It has both plant and animal origin.<br>Presence of flagellum and many vacuoles shows that this organism is an animal;<br>Presence of chloroplast and cell wall shows that this organism is a plant;<br>Both plant and animal has cytoplasm, cell membrane and mitochondria.<br>[Total: 4] |         |
| B2(a)       | W;<br>30 % sugar solution has lower water potential than potato strip;<br>Water molecules leave potato strips by osmosis;<br>Causing the length of potato strips to shorten<br>[Total: 4]                                                                                                  |         |

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| (b)   | <p>X;</p> <p>There is no net change in the length of the potato strip;</p> <p>Hence no net movement of water molecules;</p> <p>Movement of water molecules into and out of the potato strips is the same</p> <p>[total: 3]</p>                                                                                                                                                                                                   |  |
| B3(a) | V & W [Total:1]                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| (b)   | <p>When W contract, blood will be sent to other parts of the body;</p> <p>Thicker muscle will create the high pressure when W contract</p> <p>[Total: 2]</p>                                                                                                                                                                                                                                                                     |  |
| (c)   | <p>Oxygenated blood will not be transported efficiently and waste materials especially carbon dioxide cannot be removed;</p> <p>Blood on left side of heart (oxygenated blood) will mix with blood on right side of the heart (deoxygenated blood)</p> <p>[Total: 2]</p>                                                                                                                                                         |  |
| B4    | <p>Inner wall has many folds known as villi;</p> <p>Villi increases surface area:volume ratio to absorb digested food;</p> <p>Villi is also rich in blood capillaries;</p> <p>Create concentration gradient to allow more rapid diffusion of digested food;</p> <p>Epithelium layer is 1 cell thick;</p> <p>This shortened the distance/ digested food can enter the blood quickly</p> <p>[Any 2 features and adaptation; 4]</p> |  |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| C5(a)  | <p>[Total: 3]</p>  <p>The diagram shows a cross-section of a white blood cell. It is roughly spherical with an irregular outer boundary. The interior is filled with a stippled texture representing the cytoplasm. A large, dark, kidney-shaped structure in the center is the nucleus. Three labels with leader lines point to the cell: 'cytoplasm' points to the stippled area, 'nucleus' points to the dark central structure, and 'Cell membrane' points to the outer boundary.</p> |  |
| (b)    | <p>Red blood has no nucleus whereas white blood cell has;<br/>Red blood cell has biconcave shape whereas white blood cell has irregular shape<br/>[Total: 2]</p>                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| (c)(i) | <p>Contain haemoglobin to transport more oxygen<br/>[1]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| (ii)   | <p>Prevent backflow of blood<br/>[1]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| (iii)  | <p>Diffusion can take place quickly<br/>[1]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| (d)    | <p>Blood flowing in arteries is of higher pressure;<br/>Thicker walls of arteries allow arteries to sustain the high pressure of blood<br/>[Total: 2]</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| C6 (a) | <p>It contains amylase and protease [1];<br/>Iodine solution remains brown, biuret's reagent remains blue after enzymes has been added. It shows that starch and protein has been digested by the digestive enzymes to reducing sugar and amino acid. [1]</p>                                                                                                                                                                                                                                                                                                               |  |

|     |                                                                                                                                                                                                                                                                              |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| (b) | Biuret reagent remains blue, iodine solution remains brown and benedict's solution remains blue [1]<br>Alternative answer: All the tests will show negative results.<br>Gastric juice contains protease which will digest proteins to amino acids/shorter protein chains [1] |  |
| (c) | To show that the enzymes is responsible for the digestion of proteins and starch.<br>Alternative answer: Test tube C acts as a control [1]                                                                                                                                   |  |
| (c) | Starch is digested to reducing sugar / maltose [reject glucose or sugar];<br>By enzyme amylase;<br>Maltose is digested to glucose;<br>By enzyme maltase;<br>Shorter protein chains is digested to amino acid;<br>By enzyme protease<br>[max 5]                               |  |