

Index Number	Class	Name
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CHIJ ST JOSEPH'S CONVENT SEMESTRAL ASSESSMENT 2



SCIENCE (CHEMISTRY)

Secondary 1 Express

Friday, 5 October 2018
50 minutes

READ THESE INSTRUCTIONS FIRST

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

Section A

There are **ten** questions. Answer **all** questions. For each question there are four possible answers **A, B, C, and D**.

Choose the **one** you consider correct and shade your choice in the Multiple Choice Answer Sheet with a 2B pencil.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Section B

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

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

Show all your working on the same page as the rest of the answer.

Omission of essential working will result in loss of marks.

Electronic calculator may be used in this paper.

The total of the marks for this paper is 40.

A copy of the Periodic Table is printed on page 13.

FOR EXAMINER'S USE	
A	
B	
Total	40

This document consists of **13** printed pages.

Setter(s) : Mr Tan Keng Chiaw and Ms Izzati Jamil

Section A (10 marks)Answer **all** questions.

- 1 "Amy drew a graph using the data she obtained from her experiments."

Which step in the scientific inquiry process is the statement describing?

- A analyzing results
- B forming a hypothesis
- C designing an experiment
- D conducting an experiment

- 2 An experiment was conducted to investigate how the volume of air affects the colour of the Bunsen burner flame.

Which of the following is the independent variable in this experiment?

- A the volume of air
- B the color of the flame
- C the height of the collar
- D the location of the experiment

- 3 An element is found to have the following properties:

- good electrical conductivity,
- shiny in appearance,
- solid at room temperature.

What is the element most likely to be?

- A boron
- B silicon
- C calcium
- D hydrogen

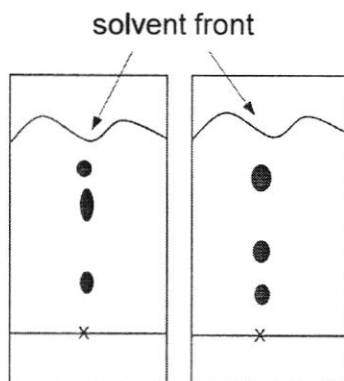
- 4 Which of the following statements best shows that copper(II) sulfate solution is a mixture?

- A Copper(II) sulfate solution is blue in colour.
- B Copper(II) sulfate is made up of different elements.
- C When heated, the water evaporates leaving a blue residue.
- D No heat is released when copper(II) sulfate is dissolved in water.

5 Which of the underlined substance can be obtained through sublimation?

- A salt from salt solution
- B flour from flour suspension
- C iodine from a mixture of iodine and salt
- D water from a mixture of water and alcohol

6 Two students carried out chromatography experiments to examine the dyes in a black ink. The chromatograms obtained by the students are shown below.



They used the same black ink. Why are the chromatograms different?

- A One student did not use enough solvent.
- B The two students used different solvents.
- C The two students used different amount of black ink.
- D The solvent moved up the paper at different speeds.

7 Upon heating, the volume of a substance increases because

- I the size of particles increases.
- II the number of particles increases.
- III the space between particles increases.

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

- 8 The table below contains information on various elements.

element	melting point (°C)	boiling point (°C)
fluorine	-220	-188
oxygen	-219	-183
nitrogen	-210	-196
chlorine	-102	-35

Particles of substance **W** slide over one another at $-185\text{ }^{\circ}\text{C}$.

Identify substance **W**.

- A fluorine
 - B oxygen
 - C nitrogen
 - D chlorine
- 9 The nuclide notation of a new substance **Z** found is ${}^{76}_{33}\text{Z}$.
- Determine the number of electrons present in **Z**.
- A 33
 - B 43
 - C 76
 - D 109
- 10 Cobalt(II) acetate has the chemical formula of $\text{Co}(\text{CH}_3\text{COO})_2$.

How many atoms are in cobalt(II) acetate?

- A 4
- B 8
- C 15
- D 16

Section B (30 marks)

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

1 A student conducted an experiment to react magnesium and hydrochloric acid.

For
Examiner's
Use

- (a) The following diagram shows the hazard symbols found on bottles of magnesium and hydrochloric acid respectively.



magnesium



hydrochloric acid

Suggest one safety precaution the student should take when handling each of the chemical.

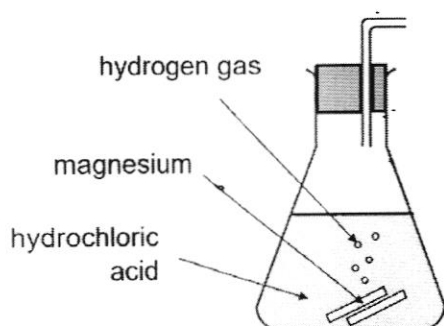
magnesium	
hydrochloric acid	

[2]

- (b) Hydrogen gas, which is insoluble in water and less dense than air, is produced during the reaction.

A student wanted to collect the hydrogen gas **but did not have a gas syringe**.

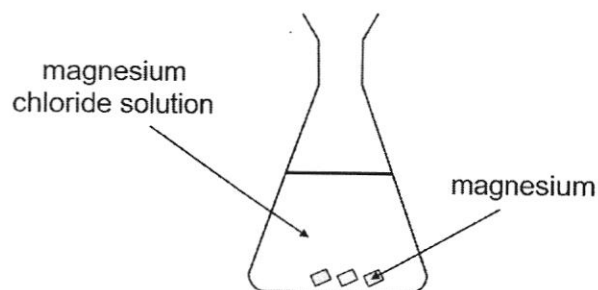
Complete the experimental set-up below (with labels) that the student can use to collect hydrogen gas.



[2]

- (c) The following diagram shows the substances remaining in the conical flask after the reaction.

For
Examiner's
Use



Describe how a pure and dry sample of magnesium chloride can be obtained.

.....

.....

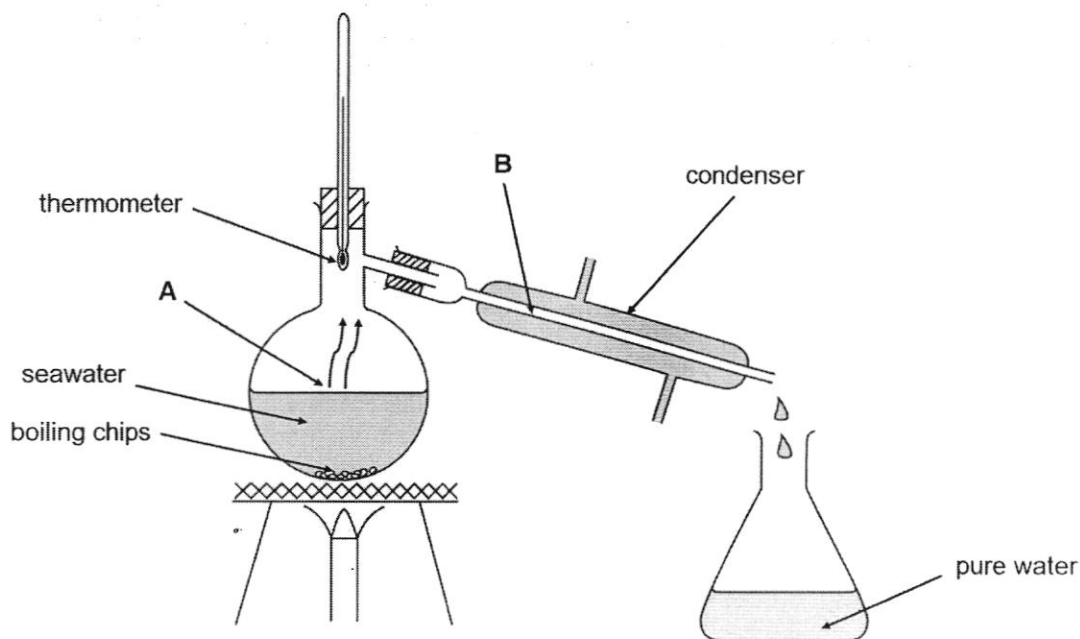
.....

.....

[2]

- 2 The diagram below shows a separation technique used by a student to obtain pure water from seawater.

For
Examiner's
Use



- (a) State the separation technique used.

[1]

- (b) State and explain how the student can tell if the water collected is pure during the experiment.

[2]

- (c) (i) Name process occurring at A and B.

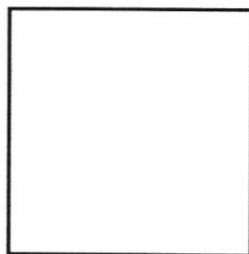
A:

B:

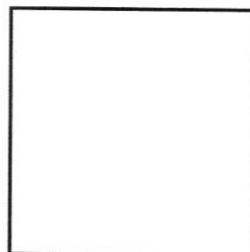
[2]

- (ii) Draw the arrangement of water particles before and after process **A** in the boxes provided below.

For
Examiner's
Use



before



after

[2]

- (iii) Using Kinetic Particle Theory, describe the change in movement and arrangement of the water particles in process **B**.

movement:

.....

.....

arrangement:

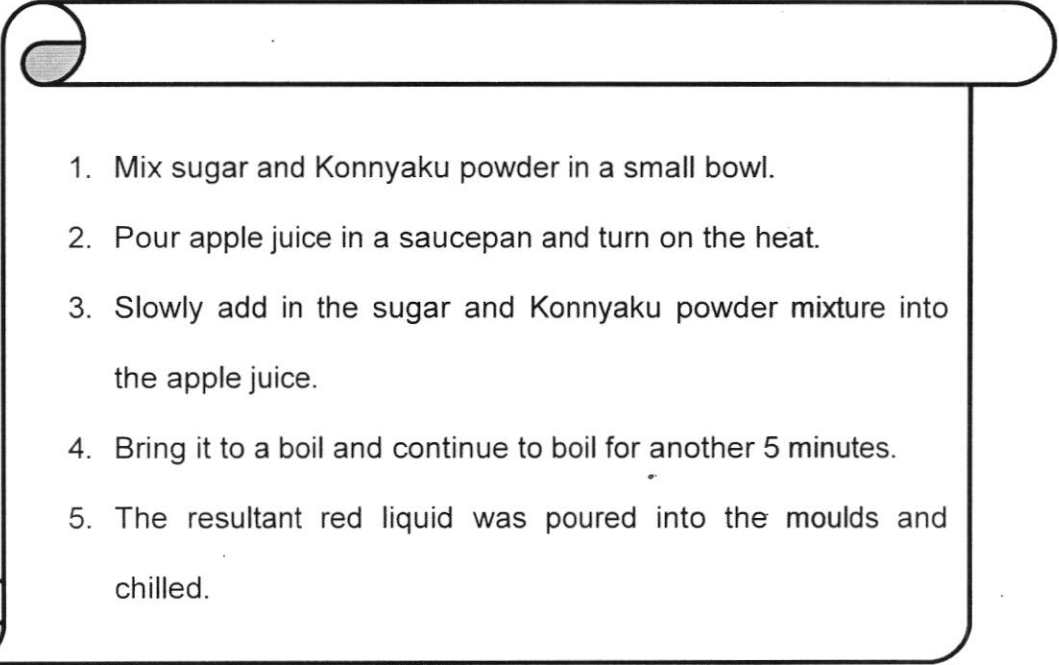
.....

.....

[3]

- 3 The following excerpt is taken from a cookbook on how to prepare apple flavoured Konnyaku Jelly.

For
Examiner's
Use

- 
1. Mix sugar and Konnyaku powder in a small bowl.
 2. Pour apple juice in a saucepan and turn on the heat.
 3. Slowly add in the sugar and Konnyaku powder mixture into the apple juice.
 4. Bring it to a boil and continue to boil for another 5 minutes.
 5. The resultant red liquid was poured into the moulds and chilled.

- (a) Identify the solute and solvent in Step 3 used to form the red liquid.

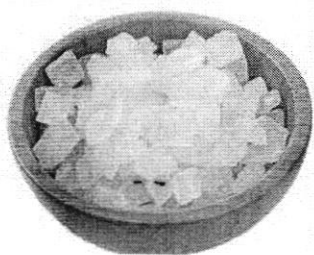
solute:

solvent: [2]

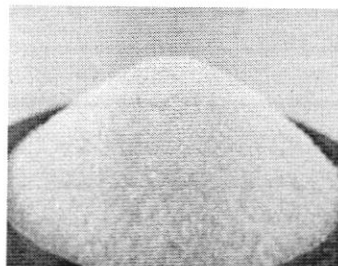
- (b) Why was the mixture brought to a boil?

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

(c)



rock sugar



fine sugar

For
Examiner's
Use

A student wanted to compare how the different types of sugar would affect the time taken to prepare the jelly. State the hypothesis of the experiment and outline how the student can check if the hypothesis is true.

hypothesis:

.....

procedure:

.....

.....

.....

.....

.....

[3]

- 4 Matter in its simplest form is called an element. The most abundant element in our atmosphere is nitrogen.

- (a) Fill in the information in the table below about the sub-atomic particles in nitrogen.

	relative charge	relative mass
protons		1
electrons		
neutrons	0	

[2]

- (b) State the nucleon number of nitrogen.

[1]

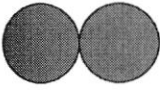
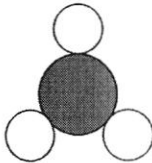
- (c) Write the electronic configuration of nitrogen.

[1]

- (d) State the Period in which nitrogen can be found in the Periodic Table.

[1]

- (e) The following table shows the diagrams of a *molecule* of nitrogen gas and ammonia gas.

nitrogen	ammonia
	

- (i) Define "molecule".

[1]

- (ii) Write down the chemical formula of nitrogen gas and ammonia gas.

nitrogen gas:

ammonia gas:

[1]

- (iii) Nitrogen gas is a diatomic molecule of an element.

Using the example of nitrogen gas, describe a molecule of ammonia gas.

.....

[1]

END OF PAPER

14

13

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.)

Index Number	Class	Name
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CHIJ ST JOSEPH'S CONVENT SEMESTRAL ASSESSMENT 2



SCIENCE (BIOLOGY)

Secondary 1 EXPRESS

Friday, 5 October 2018
50 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

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

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

Working in pencil will not be marked.

You may use an HB pencil for any diagrams or graphs

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

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 in the multiple choice answer sheet.

Section B

Answer all questions. Write your answers in the spaces provided on the question paper.

FOR EXAMINER'S USE	
Total	40

This document consists of 11 printed pages.

Setter(s) : Ms Mary Charles

[Turn over

Section A (10 marks)
Answer **all** the questions.

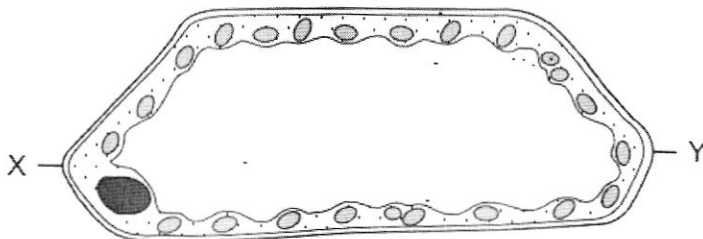
- 1 Cells contain structures V, W, X, Y and Z.
Each structure has a specific function as shown in the table.

structure	function
V	strengthens and supports the cell
W	absorbs light energy
X	is where chemical reactions take place
Y	controls the activities of the cell
Z	controls what enters and leaves the cell

Which pair of structures are not found in an animal cell?

- A V and W B V and Z C W and X D X and Y
- 2 Insulin is a hormone that is produced in the pancreas. It is a protein.
Which organelles are present in large numbers in cells that produce insulin?

- A nuclei and mitochondria
B ribosomes and mitochondria
C rough endoplasmic reticulum and cell walls
D vesicles and nuclei
- 3 The diagram shows a high-power drawing of a plant cell. The distance between X and Y on the diagram below is 80mm. The actual length of the cell between X and Y was 0.16mm.
What is the magnification of the cell?

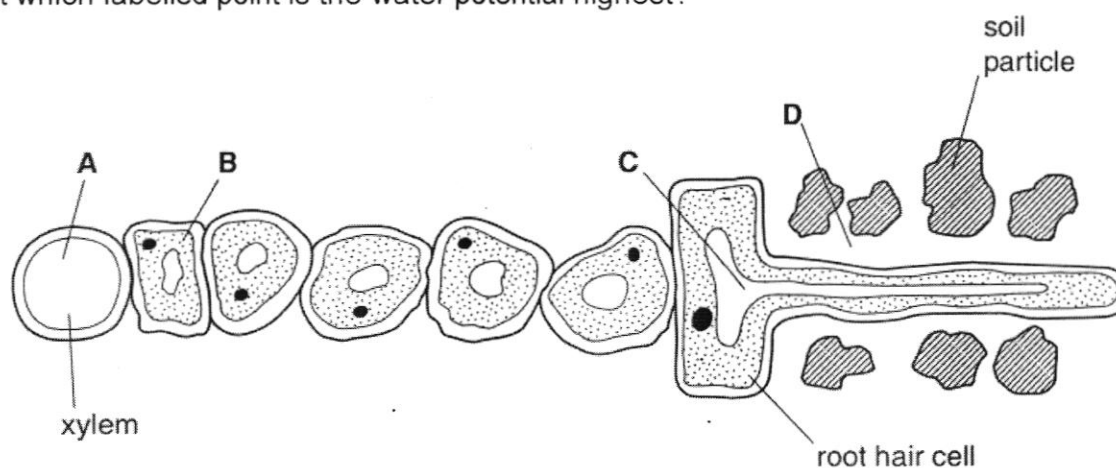


- A $\times 50.0$ B $\times 100.0$ C $\times 500.0$ D $\times 1000.0$

- 4 A new cell is being examined.
Which feature would enable you to identify it as a plant cell or an animal cell?

- A The cell contains a single large sap vacuole.
- B The cell contains glucose and amino acids.
- C The cell contains stored fat.
- D The cell surface membrane is partially permeable.

- 5 The diagram shows part of a plant root in the soil. The root is absorbing water.
At which labelled point is the water potential highest?



- 6 Which processes can **only** occur through a membrane?

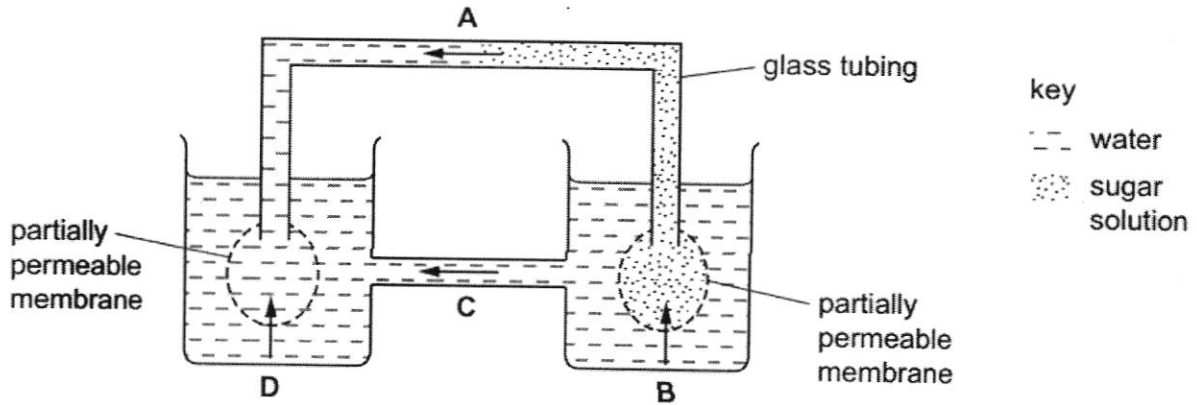
	active transport	diffusion	osmosis
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = yes

x = no

- 7 The diagram shows an experiment on osmosis. Which arrow shows the direction of the net movement of water at the start of the experiment?



- 8 Which two structures are found in all plant epidermal cells?
- A cell wall and nucleus
- B cell wall and chloroplasts
- C chloroplasts and starch grains
- D nucleus and starch grains
- 9 Which row shows the most likely number of chloroplasts in three types of cell in a leaf?

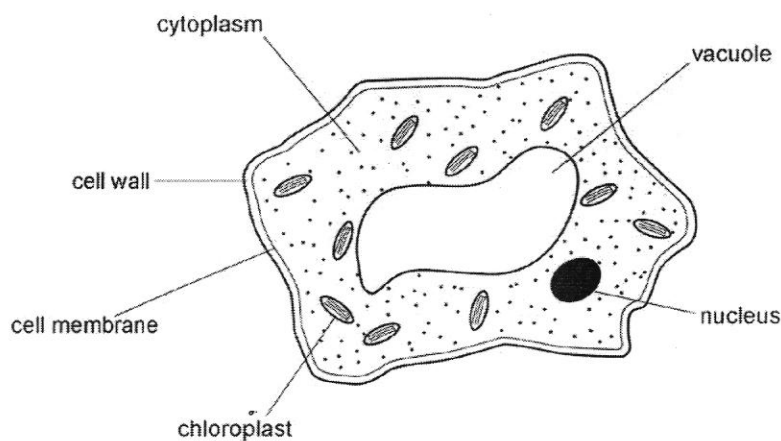
	epidermis	mesophyll	vascular bundle cell
A	0	6	17
B	0	17	0
C	17	6	0
D	17	0	6

- 10 What is the pathway taken by water as it travels through a plant?

- A mesophyll cells → xylem → root cells → root hair cells
- B root cells → root hair cells → mesophyll cells → xylem
- C root hair cells → root cells → xylem → mesophyll cells
- D xylem cells → mesophyll → root cells → root hair cells

Section B (30 marks)

Answer all questions.

B1 Fig. 1.1 shows a typical plant cell.For
examiner's
use**Fig. 1.1****(a)** Name the part of the cell that**(i)** controls the movement of substances into and out of the cell,

..... [1]

(ii) is needed for cell division.

..... [1]

(b) Root hair cells are specialised plant cells.**(i)** Which part, labelled in Fig. 1.1, is not present in a root hair cell?

..... [1]

(ii) Why is this part not needed in a root hair cell?

 [1]
(iii) Explain how a root hair cell is adapted to carry out its function.

 [2]

B2 Fig. 2.1 below shows three nerve cells (neurones) seen under a light microscope.

*For
examiner's
use*

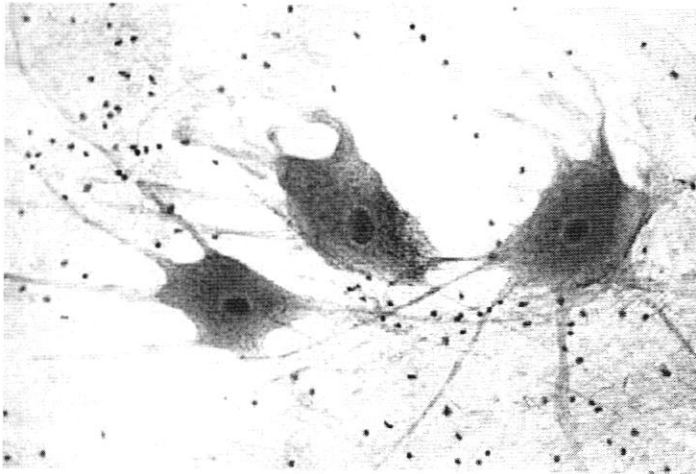
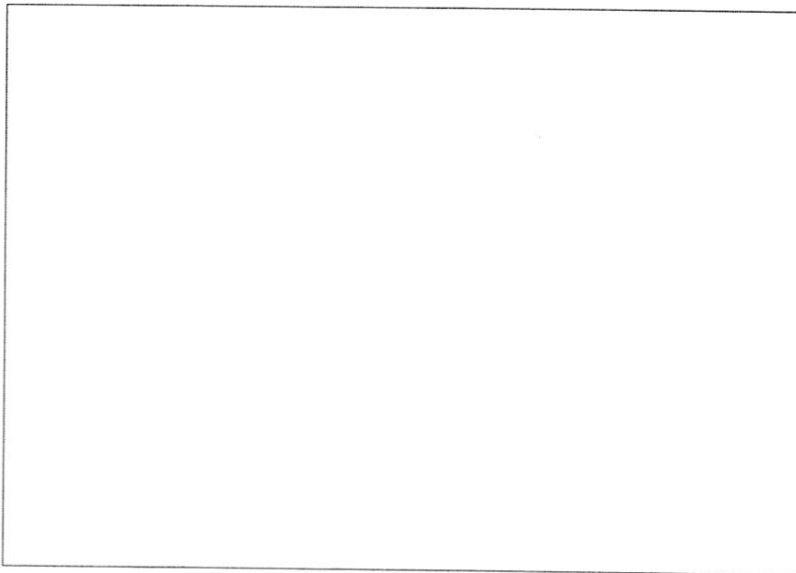


Fig. 2.1

- (a)** In the space below, make a drawing of **one** of the nerve cells as seen in Fig. 2.1. Label your drawing.



[3]

(b) Fig. 2.2 shows some details about the structure of the stomach.

For
examiner's
use

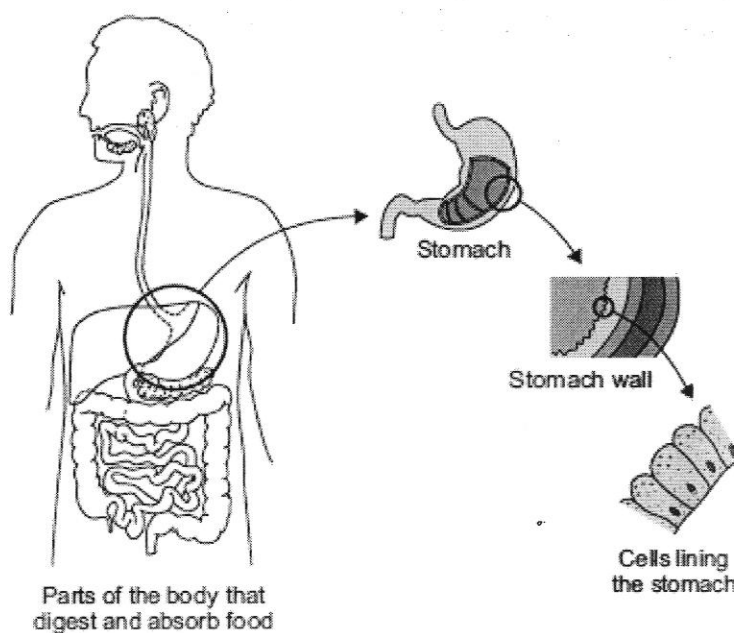


Fig. 2.2

Complete **Table 2** to show whether each structure is an organ, an organ system or a tissue. For each structure, tick (✓) **one** box.

Table 2

structure	organ	organ system	tissue
stomach			
cells lining the stomach			
mouth, oesophagus, stomach, liver, pancreas, small and large intestine			

[3]

B3 Two leak-proof Visking tubing bags were set up as shown in Fig. 3.1.

- The bags were filled with equal volumes of solution.
- The bags were suspended in the same dilute glucose solution for two hours.

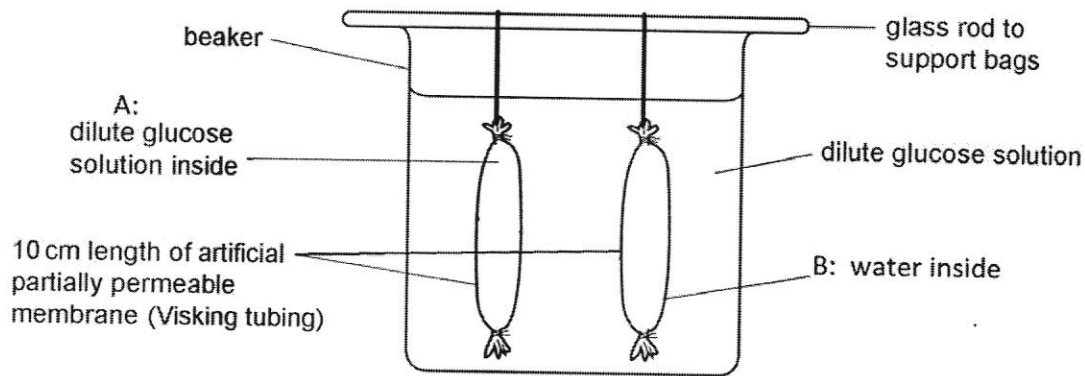


Fig. 3.1

- (a) After two hours, the volumes of the bags were measured. What results would you expect for tubing **A** and **B**?

tubing **A**

tubing **B** [2]

- (b) Explain the changes observed in tubing **B**.

.....

 [3]

B4 Three samples of human blood **A**, **B** and **C**, are mixed with three salt solutions of different concentrations.

The blood samples are then observed under the microscope.

The results are shown in Table 4.

- (a) Complete Table 4 by drawing the appearance of a red blood cell in blood sample **A** and **B**.

Table 4

blood sample	observations	appearance of cells
A	red blood cells are small and wrinkled	
B	red blood cells are normal in size and shape	
C	no cells can be seen	

[2]

- (b) Which blood sample is mixed with the most concentrated salt solution?

..... [1]

- (c) Explain the observation for blood sample **C**.

.....

.....

..... [2]

B5 The diagram in Fig.5.1 shows a section through part of a dicotyledonous leaf.

For
examiner's
use

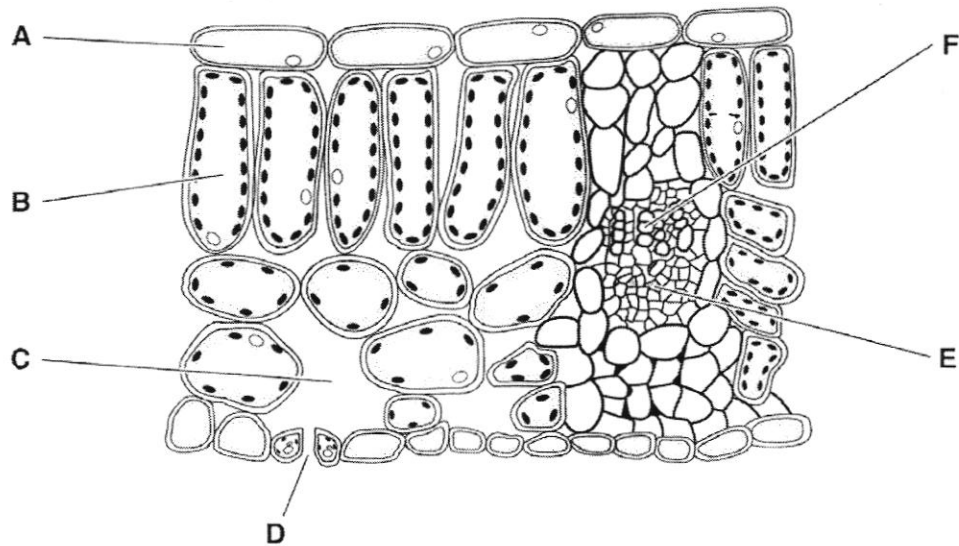


Fig. 5.1

(a) Refer to Fig.5.1 and complete the table below.

label	
	xylem vessel
C	
D	

[3]

(b) Describe the functions of the xylem.

.....

.....

.....

.....

[2]

(c) Carbon dioxide moves from the air outside the leaf to the cell marked **B**.
Describe the role of the parts labelled **C** and **D** in this movement.

.....

.....

.....

.....

[2]

(d) State the word equation for photosynthesis.

.....

[1]

End of paper

SCIENCE (CHEMISTRY)
Semestral Assessment 2 - Mark Scheme

Secondary 1 Express SA2 2018

Section A (5 marks)

Question	1	2	3	4	5	6	7	8	9	10
Answer	A	A	C	C	C	B	B	B	A	C

Section B (20 marks)

Qn	Answers	Marks
1a	magnesium: keep away from open flame/high temperatures hydrochloric acid: wear gloves/avoid contact with chemical	1 1
1b	Downward delivery Delivery tube – label Measuring cylinder – label OR Water displacement Delivery tube – label Measuring cylinder – label 1m for method, 1m for accurate drawing and labelling	2 2
1c	<u>Filter</u> the mixture. Residue – magnesium, filtrate – magnesium chloride <u>Evaporate filtrate to dryness</u> to obtain magnesium chloride.	1 1
2a	Simple distillation (Reject distillation)	1
2b	Check the thermometer. The <u>thermometer should read 100 °C.</u> <u>Pure water boils at 100 °C.</u>	1 1
2ci	A: boiling B: condensation	1
2cii	before: liquid drawing after: gas drawing	1

2ciii	movement: change from <u>moving rapidly, in all directions</u> to <u>sliding over one another</u>	1												
	arrangement: change from <u>far apart</u> to <u>close together</u>	1												
	& arrangement: change from <u>disorderly manner</u> to <u>orderly manner</u>	1												
3a	Solute: sugar and konnyaku powder Solvent: apple juice	1 1												
b	To <u>speed up the dissolving</u> of that the solute(named or not).	1												
c	The bigger the sugar crystal the longer the time taken for the jelly to be prepared.	1												
	OR Rock sugar will increase the time taken for the jelly to be prepared.													
	Add 5g(stated amount or equal amounts) of rock sugar into 10ml(stated amount or equal amounts) of apple juice. (mark to be awarded for constant variables)	1												
	Record the time taken for the sugar to dissolve in the apple juice. (mark to be awarded for measurement of dependent variable)	1												
**there is no need to mention about boiling. If students do mention it, no marks is awarded.														
4	<table border="1"> <thead> <tr> <th></th><th>relative charge</th><th>relative mass</th></tr> </thead> <tbody> <tr> <td>protons</td><td>+1</td><td>1</td></tr> <tr> <td>electrons</td><td>-1</td><td>1/1840</td></tr> <tr> <td>neutrons</td><td>0</td><td>1</td></tr> </tbody> </table> Every 2 correct – 1m		relative charge	relative mass	protons	+1	1	electrons	-1	1/1840	neutrons	0	1	2
	relative charge	relative mass												
protons	+1	1												
electrons	-1	1/1840												
neutrons	0	1												
b	14	1												
c	2.5	1												
d	Group V, period 2	1												
ei	A molecule is made up of two or more atoms chemically combined	1												
eii	Nitrogen: N ₂ Ammonia: NH ₃	1												
eiii	Triatomic molecule of a compound	1												

ANSWERS TO SEC 1 EXP BIOLOGY SA2 2018

1	2	3	4	5
A	B	C	A	D
6	7	8	9	10
C	B	A	B	C

B1	Controls movement - cell membrane For cell division - nucleus	1 1																
	Chloroplasts As root hair cells are found in soil/ underground, cannot photosynthesise	1 1																
	<u>long and narrow cellular extension</u> which greatly increases the <u>surface area to volume ratio</u> of the cell for faster absorption of water and minerals from the soil	1 1																
B2	a																	
	Neat, large, clear lines	1																
	Shape	1																
	Labels must include: nucleus, cell membrane, cytoplasm	1																
	b																	
	<table><tr><td>structure</td><td>organ</td><td>organ system</td><td>tissue</td></tr><tr><td>stomach</td><td>✓</td><td></td><td></td></tr><tr><td>cells lining the stomach</td><td></td><td></td><td>✓</td></tr><tr><td>mouth, oesophagus, stomach, liver,</td><td></td><td>✓</td><td></td></tr></table>	structure	organ	organ system	tissue	stomach	✓			cells lining the stomach			✓	mouth, oesophagus, stomach, liver,		✓		1 1 1
structure	organ	organ system	tissue															
stomach	✓																	
cells lining the stomach			✓															
mouth, oesophagus, stomach, liver,		✓																
B3	tubing A - no change in volume tubing B - volume will decrease 1 there is a higher water potential in tubing B than in the dilute glucose solution. 2 Osmosis takes place 3 There is a net movement of water molecules down a water pot gradient from the tubing into the beaker 4 through a partially permeable membrane (visking tubing)	1 1 1 mark each Max =3																

Red blood cells swell and burst.

F	
C	Intercellular air space
D	Stomatal pore / stoma

to carry water and dissolved mineral salts from the roots to the other parts of the plant.

to provide mechanical support to the plant