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Name	Class	Index Number

UNITY SECONDARY SCHOOL

MID YEAR EXAMINATION 2018

SECONDARY ONE EXPRESS



SCIENCE

7 MAY 2018

Paper 1

Paper 1 & 2: 2 HOURS

Additional Materials : Optical Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, class and register number in the spaces provided at the top of the answer booklet.

There are **thirty** questions on this paper. 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 Optical Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

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

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 2 of Paper 1.

The total marks for this booklet is 30 marks.

This paper consists of **13** printed pages, including this cover page.

Group																		
I	II		1 H hydrogen 1			III	IV	V	VI	VII	0							
Key proton (atomic) number atomic symbol name relative atomic mass																		
3 Li lithium 7	4 Be beryllium 9		21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88		39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium -	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137		57 – 71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium -	85 At astatine -	86 Rn radon -
87 Fr francium -	88 Ra radium -		89 – 103 actinoids	104 Rf Rutherfordium -	105 Db dubnium -	106 Sg seaborgium -	107 Bh bohrium -	108 Hs hassium -	109 Mt meitnerium -	110 Ds darmstadtium -	111 Rg roentgenium -	112 Cn copernicium -		114 Fl flerovium -		116 Lv livermorium -		

57	La	lanthanum	139
58	Ce	cerium	140
59	Pr	praseodymium	141
60	Nd	neodymium	144
61	Pm	promethium	—
62	Sm	samarium	150
63	Eu	europtium	152
64	Gd	gadolinium	157
65	Tb	terbium	159
66	Dy	dysprosium	163
67	Ho	holmium	165
68	Er	erbium	167
69	Tm	thulium	169
70	Yb	yterbium	173
71	Lu	lutetium	175
72	Hf	hafnium	178
73	Ta	tantalum	181
74	W	wolfram	184
75	Re	rhodium	186
76	Os	osmium	190
77	Ir	iridium	192
78	Pt	platinum	195
79	Au	aurum	197
80	Hg	hydrargyrum	200
81	Tl	thallium	204
82	Pb	plumbum	207
83	Bi	bismuth	209
84	Po	polonium	—
85	At	astatine	—
86	Rn	radon	—
87	Fr	francium	—
88	Ra	radium	—
89	Ac	actinium	—
90	Th	thorium	232
91	Pa	protactinium	231
92	U	uranium	238
93	Np	neptunium	—
94	Pu	plutonium	—
95	Am	americium	—
96	Cm	curium	—
97	Bk	berkelium	—
98	Cf	californium	—
99	Es	einsteinium	—
100	Fm	fermium	—
101	Md	mendelevium	—
102	No	nobelium	—
103	Lr	lawrencium	—

89	Th	actinium
90	Pa	protactinium
91	U	uranium
92	Np	neptunium
93	Pu	plutonium
94	Am	americium
95	Cm	curium
96	Bk	berkelium
97	Cf	californium
98	Es	einsteinium
99	Fm	fermium
100	Md	mendelevium
101	No	nobelium
102	Lr	lawrencium
103		

any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

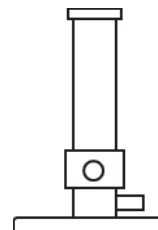
Section A: Multiple Choice Questions (30 marks)

Answer **all** the questions in the Optical Answer Sheet provided.

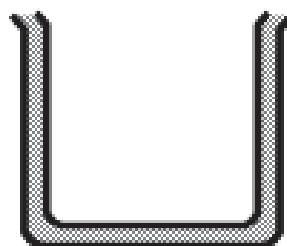
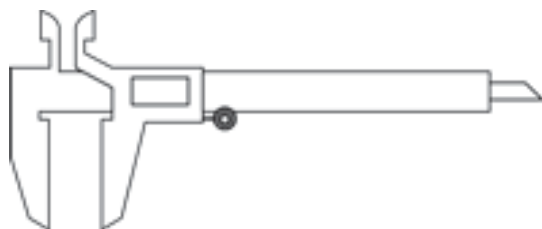
- 1 Russell lighted the Bunsen burner and opened the air hole of the Burner.

Which statement best describes the flame that Russell will get?

- A A luminous flame that is orange-yellow.
- B A luminous flame that is pale blue.
- C A non-luminous flame that is orange-yellow.
- D A non-luminous flame that is pale blue.



- 2 Nurul was given a vernier caliper to find out the accurate dimension of the thickness of the beaker (the shaded part).



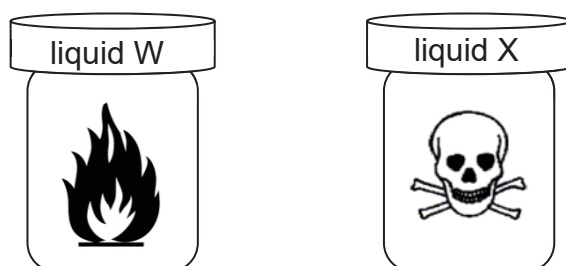
Which part(s) of the vernier caliper should she use?

- A inside jaw and tail.
 - B outside jaw and tail.
 - C only the inside jaws.
 - D only the outside jaws.
- 3 A substance contains a biological agent that can spread through air and cause allergic reactions when inhaled.

Which symbol should be used to label it?

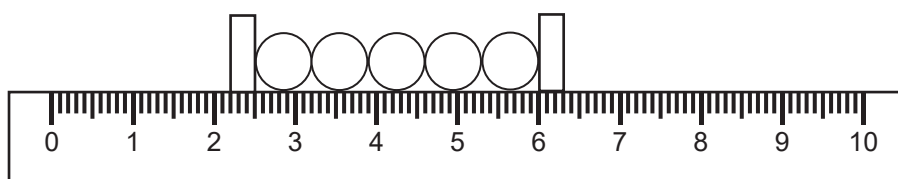


- 4 Ahmad saw two bottles on the workbench. They are labelled as shown in the diagram.



Based on the labels, which of the following is the best conclusion he can make about the liquids?

- A Both liquids are acidic.
 - B Both liquids cannot be mixed.
 - C Liquid W should be heated before use.
 - D Liquid X cannot be touched with bare hands.
- 5 A ruler is used to measure the diameter of five plastic balls.



What is the average diameter of each ball?

- A 0.70 cm
 - B 0.76 cm
 - C 0.82 cm
 - D 3.50 cm
- 6 Which of the following shows the correct SI unit for each physical quantity?

7		length	mass	temperature	time
	A	centimetre	kilogram	degree celcius	second
	B	centimetre	gram	kelvin	hour
	C	metre	kilogram	kelvin	second
	D	metre	gram	degree celcius	hour

Ai Ling was given cup Q and cup P. Cup Q is made using material Q. Cup

P is made using material **P**. Both materials are waterproof. She wants to find out which material is best for keeping water cold as long as possible.

What must she do to ensure a fair test?

- A** Place both cups in a science laboratory.
- B** Place both cups the same distance apart.
- C** Pour cold water into each cup at the same speed.
- D** Pour equal volumes of cold water in each cup.

- 8** Jill was asked to calculate the density of Singapore's 50-cent coin.

Which set of apparatus should she use to take the measurements of the coin?

	diameter and thickness	mass
A	measuring tape	electronic balance
B	metre rule	spring balance
C	vernier calipers	spring balance
D	vernier calipers	electronic balance

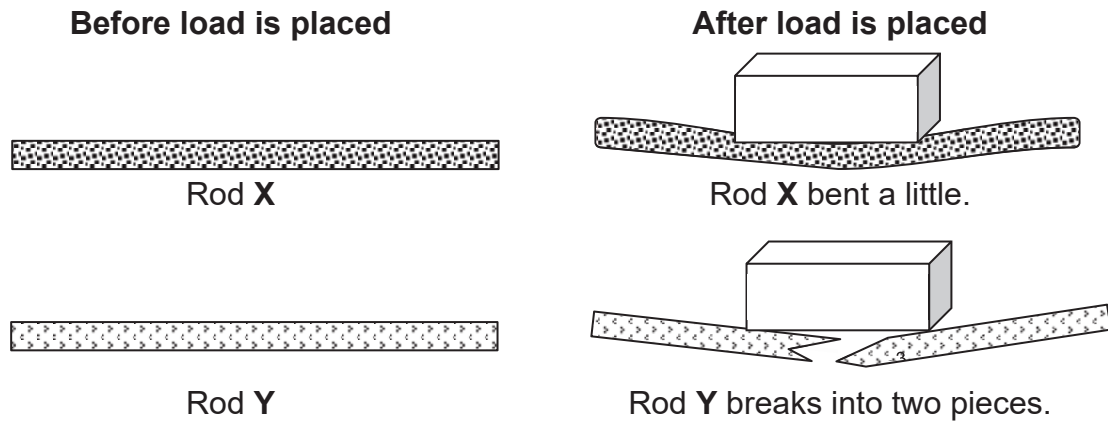
- 9** The diagram shows two wooden blocks made from the same material.



Which statement about the densities of the wooden blocks is true?

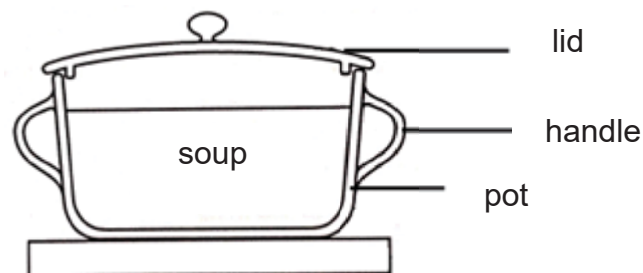
- A** Block **A** has a higher density than Block **B**.
- B** Block **A** has a lower density than Block **B**.
- C** Blocks **A** and **B** have the same density.
- D** There is insufficient information to determine the densities of the blocks.

- 10 The diagram shows two rods, **X** and **Y**, made from different materials. When load is placed on them, rod **X** bent a little while rod **Y** broke into two pieces.



Which of the following conclusions is correct about the two rods?

- A Rod **X** is harder than rod **Y**.
 - B Rod **X** is more dense than rod **Y**.
 - C Rod **X** is more flexible than rod **Y**.
 - D Rod **X** is softer than rod **Y**.
- 11 The diagram below shows a cooking pot containing hot soup.



Which of the following best describes the materials used for the parts of the pot?

- | | lid | handle | pot |
|---|-----------------|-----------------|-----------------|
| A | glass | stainless steel | glass |
| B | stainless steel | stainless steel | plastic |
| C | glass | plastic | stainless steel |
| D | stainless steel | plastic | plastic |

- 12** An iron block with the length of 5 cm, height of 3 cm, breath of 2 cm and density of 7.9 g/ cm^3 is immersed in a beaker containing 20 cm^3 of water.

What is the mass of the iron block?

- A** 0.553 kg
- B** 0.395 kg
- C** 0.237 kg
- D** 0.079 kg

- 13** 10 g of each of the following materials was to be placed in a container.

Which material would require the largest container?

- A** glass with density of 2.5 g/ cm^3
- B** seawater with density of 1.03 g/ cm^3
- C** lead with density of 11.3 g/ cm^3
- D** alcohol with density of 0.79 g/ cm^3

- 14** Theobromine has a bitter taste and is found in cocoa beans. The formula for theobromine is $\text{C}_7\text{H}_8\text{N}_4\text{O}_2$.

Which of these elements is found in Group V, period 2?

- A** carbon
- B** hydrogen
- C** nitrogen
- D** oxygen

15 The diagram shows a section of the Periodic Table with elements **P**, **Q**, **R**, **S** and **T**. The letters **P**, **Q**, **R**, **S** and **T** are not symbols of the elements.

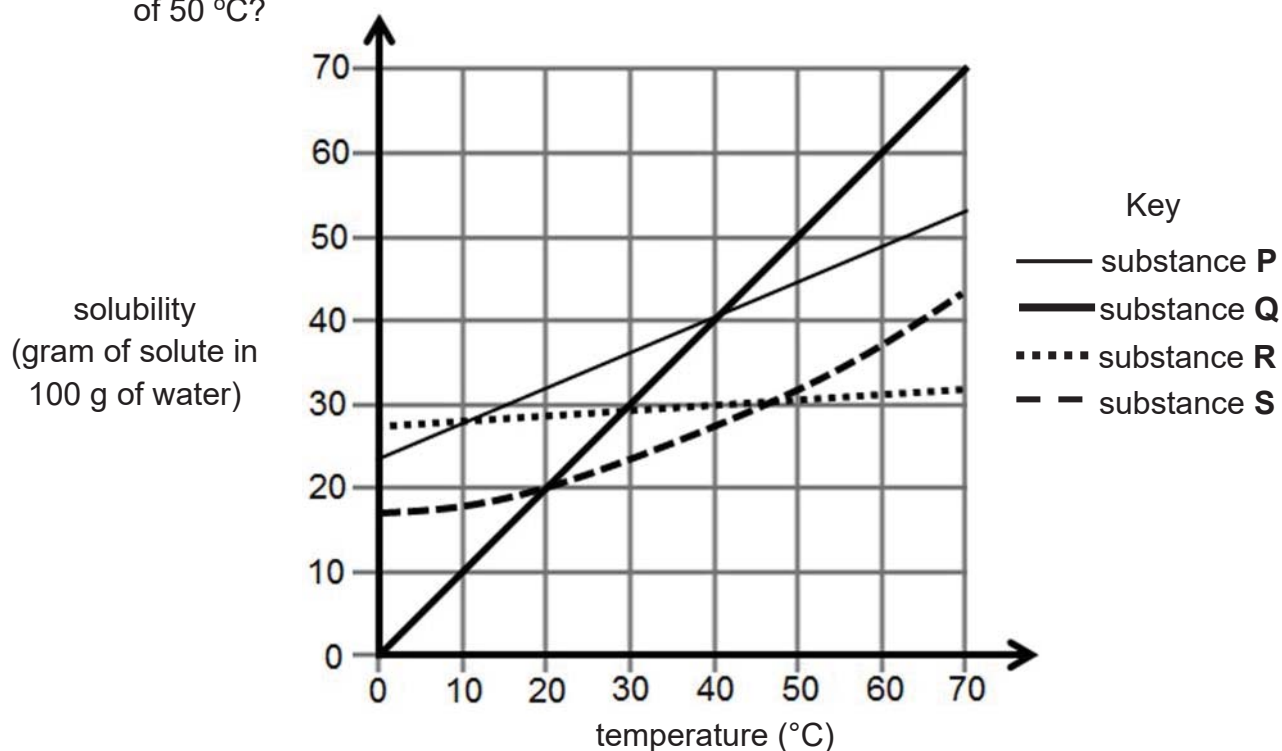
[illegible]

Which of the following pairs of elements contains only non-metals?

- A** P and T
- B** P and S
- C** Q and R
- D** S and T
- 16** Which element belongs to group II and period 3 of the Periodic Table?
- A** boron
- B** beryllium
- C** calcium
- D** magnesium
- 17** Which of the following **does not** contain a mixture?
- A** water, air, carbon dioxide
- B** tungsten, brass, sulfur trioxide
- C** iodine, astatine, ammonia
- D** sodium, water vapour, air

Refer to the following diagram for questions **18** and **19**.

- 18** Which of the following substances has the highest solubility at a temperature of 50 °C?



- A** substance P
- B** substance Q
- C** substance R
- D** substance S
- 19** At what temperature do substances **Q** and **R** have the same solubility?
- A** 20 °C
- B** 30 °C
- C** 42 °C
- D** 65 °C

- 20** Some properties of substances **P**, **Q**, **R** and **S** are given in the table below:

substance	percentage composition by mass	solid conducts electricity	changes on heating
P	varies	no	liquid burns to form carbon dioxide and water
Q	constant	yes	solid burns in air to form an oxide
R	constant	no	solid decomposes
S	varies	yes	solid melts

Which classification of the substances is correct?

	element	mixture	compound
A	S, Q	P	R
B	Q	P, S	R
C	S	P	Q, R
D	R	P, S	Q

- 21** Which of the following statements concerning compounds is **incorrect**?
- A** The amount of elements in a compound is in fixed ratio.
 - B** No energy changes take place when a compound is formed.
 - C** A compound can be separated into elements by chemical methods.
 - D** The properties of a compound are very different from the elements it contains.

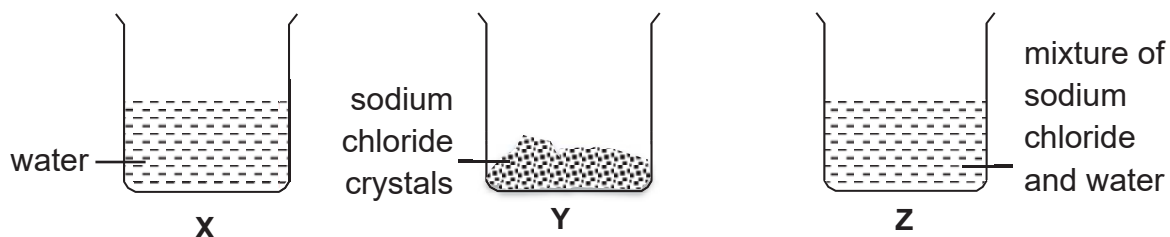
Study the table and answer questions **22** and **23**.

The table below shows the masses of four solids dissolved in various solvents.

solvent	mass of solids dissolved (g)			
	P	Q	R	S
solvent J	0	0	0	30
solvent K	12	0	27	10
solvent L	10	6	15	12
solvent M	1	37	0	0

- 22** Which solid is insoluble in solvent **K**?
- A** P
- B** Q
- C** R
- D** S
- 23** If solids **R** and **S** are mixed together by mistake, which of the following solvents can be used to separate them?
- A** J
- B** K
- C** L
- D** M
- 24** Sarah has a mixture of salt and sugar that is dissolved in a beaker of water. She tried to separate the mixture of salt and sugar by filtration but it was unsuccessful.
- What could be the reason that sugar and salt cannot be separated by filtration?
- A** Both salt and sugar are white crystals.
- B** Both salt and sugar are soluble in water.
- C** Salt and sugar have different tastes.
- D** The water is purified after the mixture is filtered.

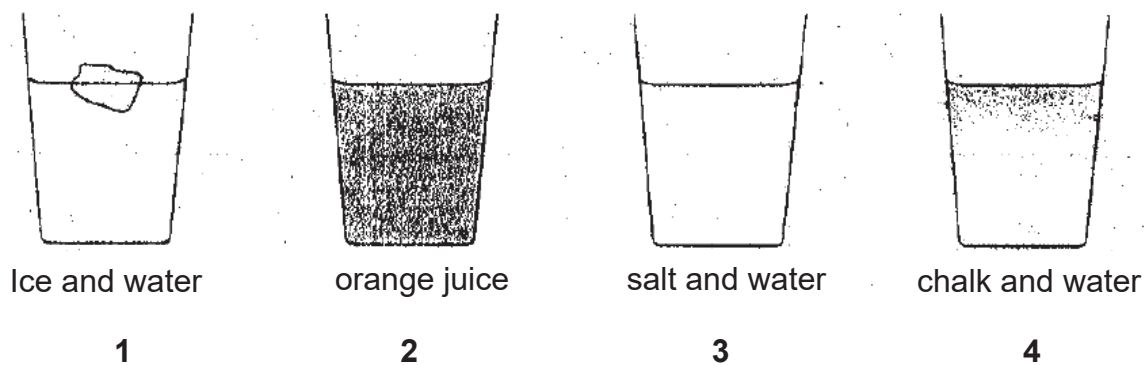
- 25** The diagram shows three beakers, **X**, **Y** and **Z**. Beaker **X** contains water, beaker **Y** contains sodium chloride crystals and beaker **Z** contains a mixture of sodium chloride and water. Sodium chloride crystals can be dissolved in water.



Based on the information above, which of the following correctly represents the solute, solvent and solution?

	X	Y	Z
A	solute	solution	solvent
B	solution	solute	solvent
C	solute	solvent	solution
D	solvent	solute	solution

- 26** Which of the following is a suspension?



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

27 Which one of the following pairs of features is present in both plant and animal cells?

- A** chloroplasts and vacuoles
- B** chloroplasts and cellulose cell wall
- C** large, central vacuole and cytoplasm
- D** plasma membrane and cytoplasm

28 Which of the following groups shows the correct order of organisation in a multicellular organism?

- A** cell → tissue → organs → system
- B** organ → cell → tissue → system
- C** system → tissue → organ → cell
- D** tissue → organ → system → cell

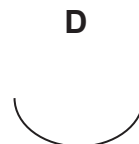
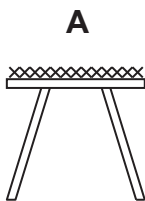
29 A cell contains genetic materials which will be passed down from generation to generation.

Which part of the cell contains the genetic materials?

- A** chromosome
- B** cytoplasm
- C** nucleus
- D** vacuole

30 Jay has some solution **K**. He wants to evaporate it to make it more concentrated.

Which of the following laboratory apparatus is **not** necessary for the experimental setup?



-- END OF PAPER --

Name	Class	Index Number

UNITY SECONDARY SCHOOL

MID YEAR EXAMINATION 2018

SECONDARY ONE EXPRESS



SCIENCE

Paper 2

7 MAY 2018

Paper 1 & 2: 2 HOURS

READ THESE INSTRUCTIONS FIRST

Write in dark blue or black ink only.

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

Write your name, class and register number in the spaces provided at the top of the answer booklet.

All workings are to be shown clearly in the spaces provided for the questions.

Section A:

Answer all questions in the spaces provided.

Section B:

Answer **three** out of the four questions in this section. Circle the question number of the questions you attempted.

A copy of the Periodic Table is printed on page 2 of Paper 1.

The total marks for this booklet is 70 marks.

This paper consists of **17** printed pages, including this cover page.

Section A: Structured Questions (40 marks)

Answer all the questions and write your answers in the spaces provided.

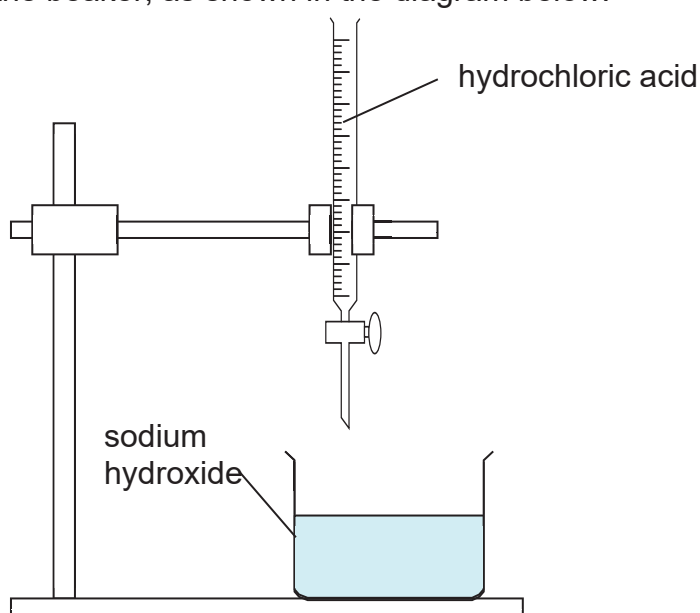
- A1** Aqueous sodium chloride can be prepared by adding an exact volume of sodium hydroxide with an exact volume of dilute hydrochloric acid.

This is called a neutralisation reaction.

The reaction is shown below.



You are given a bottle of **sodium hydroxide** and ask to **measure accurately 25.0 cm³** of it and pour it into a beaker. Hydrochloric acid is slowly added into the beaker, as shown in the diagram below.



- (a) (i) The hazard symbol seen on the bottle of sodium hydroxide and hydrochloric acid is as shown below:



What does the symbol tell us about the 2 substances?

[1]

- (ii) What should a student do when some hydrochloric acid accidentally splashes into her eyes?

[1]

- (b) Name two possible pieces of apparatus that can be used to measure the volumes of the sodium hydroxide and hydrochloric acid for this reaction. [2]

- (c) Given that sodium hydroxide, hydrochloric acid and the sodium chloride solution formed are all colourless, hence no visual observation could be seen of the reaction.

From your understanding of the formation of compounds, what other observation could be made that shows a chemical reaction had occurred.

[1]

- (d) Describe how you would obtain a pure dry sample of sodium chloride from the sodium chloride solution at the point of neutralisation. [2]

A2 Using the table of densities, identify substance **A** to **F**.

substance	density (g/ cm ³)
cork	0.25
gold	19.3
lead	11.3
mercury	13.6
turpetine	0.9
water	1.0

A: _____

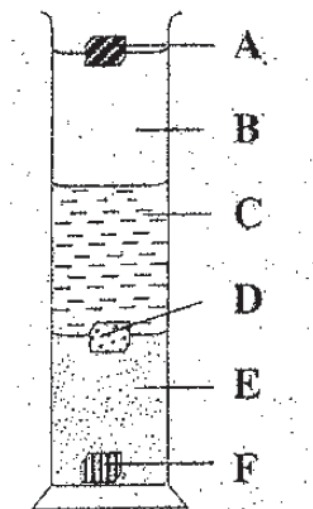
B: _____

C: _____

D: _____

E: _____

F: _____



[3]

A3 A piece of burning sodium is lowered into a gas jar containing chlorine gas. A white solid, sodium chloride, was formed.

(a) Suggest a method which sodium chloride can be changed back into sodium and chlorine. [1]

(b) Sodium chloride is a compound and sodium is an element.

Using your knowledge of elements and compounds, state one difference in properties between sodium chloride and sodium. [2]

A4 You are given a piece of irregular shaped metal.

Given apparatus below, the mass of the metal is measured using the electronic balance and recorded as **M**. The measuring cylinder is filled with 30cm³ of water. A string is tied around the metal and lower it gently into the measuring cylinder and the new volume is measured and recorded as **V**.



- (a) Name the method used to find the volume of the metal and describe [3]
how you can find the density of an irregular shaped piece of metal
using the information given.

- (b) State one precaution that you will take to ensure that the volume [1]
measured is accurate.

- (c) Styrofoam block floats on water. [1]

Using the same apparatus as above, suggest how you can modify
your procedure stated in (a) to measure the volume of the styrofoam
block.

A5 Table below shows the physical properties of different materials.

material	heat conductivity	electrical conductivity	strength	hardness	density
wood	no	poor	good	high	low
granite	no	poor	good	high	high
steel	yes	good	good	high	high

Some students have identified the uses of the above materials as follows:
In each case, indicate if each of the identified usage is 'appropriate' or 'inappropriate'.

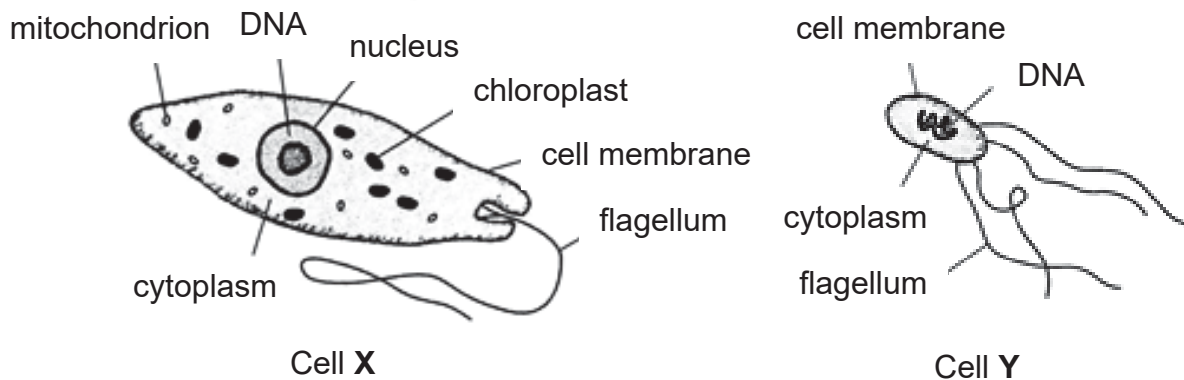
Explain your answers using data from Table above. If the identified usage is 'inappropriate', recommend another material from Table above and explain your choice.

(a) Steel is used to make aircraft bodies. [2]

(b) Wood is used to make the base of cooking pots. [2]

(c) Granite is used to make tiles. [2]

A6 The diagram below shows two types of unknown cells, **X** and **Y**.



(a) Describe the possible function of the flagellum in both cells **X** and **Y**. [1]

(b) Is cell **X** a plant cell, an animal cell or both? [3]

Provide two reasons for your answer.

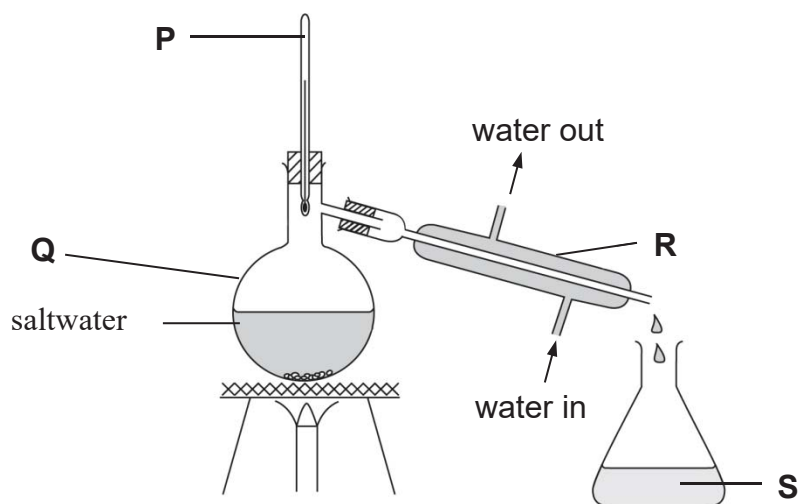
(c) Cell **X** is able to survive by itself when it is exposed to sunlight. [1]
Explain this observation.

- A7 (a)** A student accidentally dropped some chalk powder into his saltwater.

Complete the diagram below to show how the student can separate the chalk powder from the saltwater. Label your diagram. You should indicate the apparatus, the separated chalk powder and the remaining saltwater. [3]



- (b)** The student can obtain pure salt from the saltwater after the chalk powder is removed using a set-up to separate the solid-liquid mixtures is shown below.



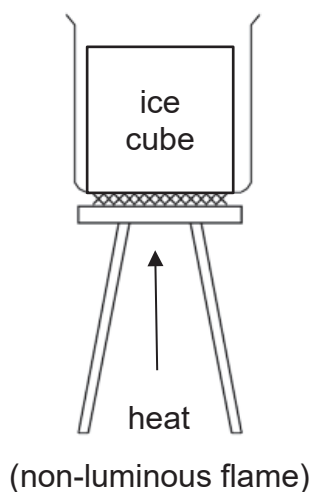
- (i)** Name the separation technique shown. [1]

- (ii)** Label the parts **P**, **Q**, **R** and **S**. [2]

P: _____
Q: _____
R: _____
S: _____

- (iii)** Describe the function of **R**. [1]

- A8** A student carried out an experiment to determine the time taken for ice cubes of different volumes to melt. The student used the experimental set-up as shown in the diagram.



- (a)** Suggest one hypothesis of this experiment. [1]

- (b)** State the independent variable that the student changed. [1]

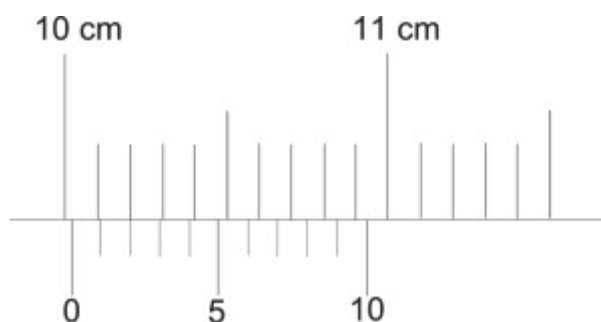
- (c)** State the dependent variable that the student observed. [1]

- (d)** Suggest how the time taken for the ice cube to melt will change if a luminous flame was used. [1]

Section B: Free Response Questions (30 marks)

Choose any **THREE** out of **FOUR** questions. Write your answers in the spaces

- B1** The diagram below shows the reading of a vernier caliper when it is used to measure the length of the cube.



- (a) (i) State the length of the cube. [1]

- (ii) Given that the cube has a mass of 40 g, calculate the density of the [3]
cube. Give your final answer correct to 3 significant figures.

- (iii) Describe what will happen if the cube is placed in a liquid of density [1]
 2.0 g/cm^3 . Explain your answer.

- (b)** A necklace is made of both pure iron and silver. 0.01 kg of iron and 20 g of silver is used. The densities of iron and silver are 19.32 g/ cm^3 and 10500 kg/ m^3 respectively.

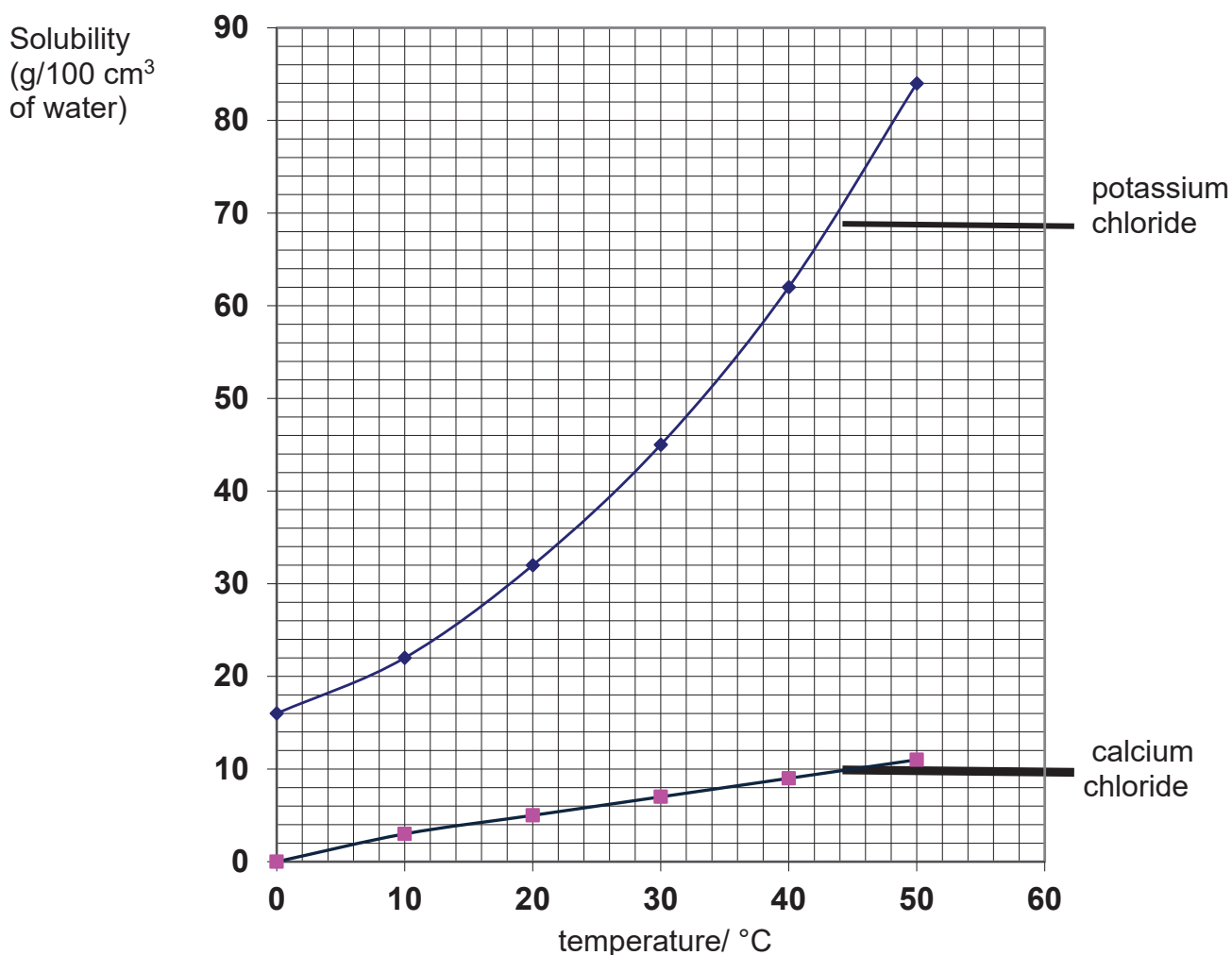
(i) Calculate the volume of iron. Give your answer in cm^3 . [1]

(ii) Calculate the volume of silver. Give your answer in cm^3 . [2]

(iii) Calculate the density of the necklace. Give your answer in g/ cm^3 . [2]

Give all your answers above correct to 3 significant figures.

- B2 (a)** Calcium chloride and potassium chloride are white solids that are soluble in water. The graph below shows the solubility of calcium chloride and potassium chloride at different temperatures.



- (i) If you need 26 g of potassium chloride to be dissolved in 100 cm³ of water, what should the temperature of water be? [1]
-
- (ii) What can you deduce about the solubility of potassium chloride as the temperature increases? [1]
-
- (iii) What can you deduce about the solubility of calcium chloride compared to that of potassium chloride as temperature increases? [1]

- (b) (i) You are provided with some potassium chloride crystals and a beaker of water.

Other than increasing the volume of water, state one other method to increase the rate of dissolving the potassium chloride in water. [1]

- (ii) Explain how the method mentioned in **b(i)** helps to increase the rate of dissolving. [1]

- (c) The diagram below shows two mixtures **A** and **B**. Mixture **A** contains 1g of sodium chloride and 100 cm³ of water, stirred for 1 minute. Mixture **B** contains 1g of chalk powder and 100 cm³ of water, stirred for 1 minute. The sodium chloride dissolves and a colourless solution is formed. Chalk powder is insoluble in water.



- (i) Describe two methods to differentiate between mixture **A** and mixture **B**. [2]

- (ii) Using one of the methods you have mentioned in (c)(i), describe the observations you would see for mixture **A** and mixture **B**. [2]

- (iii) Which mixture, **A** or **B** is a suspension? [1]

- B3 (a)** A student wants to find out how to dissolve antacid tablets in the fastest way in order to ease stomach indigestion. All experiments were stirred at 500 revolutions per minute (“rpm”). The larger the rpm, the faster the rate of stirring. The results are presented in the table below.

experiment	size of antacid	temperature (°C)	time taken for antacid to dissolve (sec)
1	fine powder	25	16
2	fine powder	60	6
3	whole tablet	25	38
4	whole tablet	60	13

- (i) Define the term ‘solubility’ of a solute. [1]

- (ii) Other than the rate of stirring, state two other variables to be kept constant for the experiment. [2]

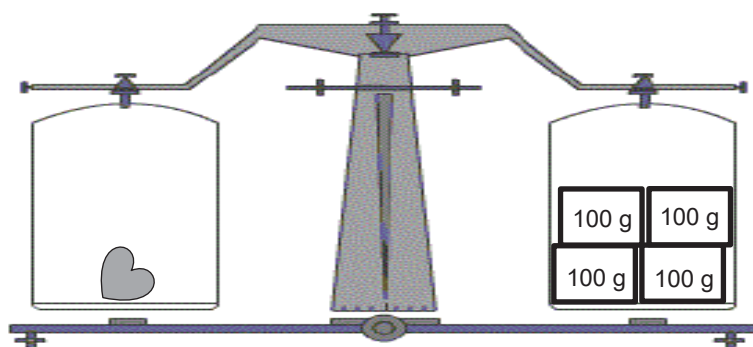
- (iii) Which two experiments should be chosen to test the following relationship?

Relationship: The larger the surface area of the antacid, the faster the rate of dissolving. [1]

- (iv) Predict what would be observed if the stirring rate was increased to 800 rpm for experiment 3. [2]

Explain your answer.

- (b) A student placed an unknown object on a beam balance to measure its mass as shown in the diagram below. The student found that four counterweights, each with a mass of 100 g, were required to balance the beam balance.



The volume of the unknown object was found to be 500 cm^3 .

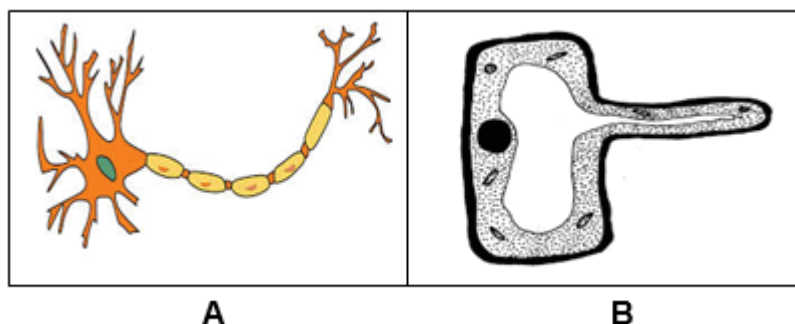
- (i) Calculate the density of the unknown object. [2]
Show your working clearly in the space provided.

- (ii) Would the unknown object float or sink in water (density = 1 g/cm^3)? [2]

Explain your answer.

B4 (a) The diagrams show two cells **A** and **B**.

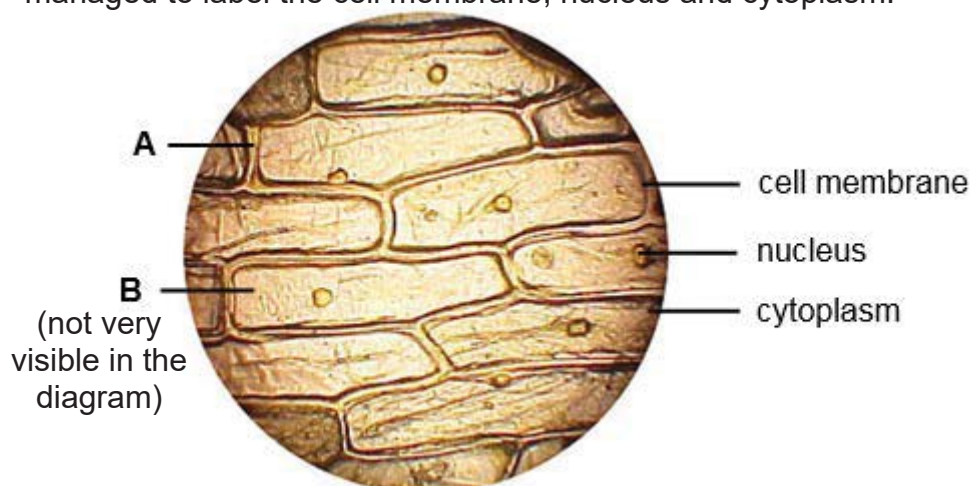
State one similarity and one difference, observed from the diagram, between cells **A** and **B**.



similarity: [1]

difference: [1]

(b) The diagram below shows the onion cell when seen under the microscope. There were 5 identified parts of the onion cell and a student managed to label the cell membrane, nucleus and cytoplasm.



(i) Using your knowledge of a typical plant cell, predict and name the 2 unlabelled parts labelled **A** and **B**. [2]

A: _____

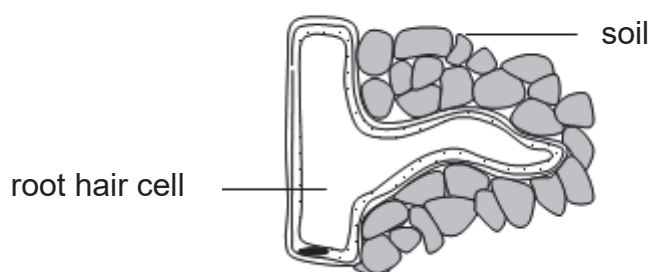
B: _____

- (ii) State the functions of part B. [1]

- (iii) If the cell membrane is unable to perform its function properly, explain how it will affect the cell. [2]

- (c) The figure below shows a root hair cell in the soil. It absorbs water from the soil by the process of osmosis.

Osmosis is the movement of water from a place of higher water potential to a place of lower water potential.



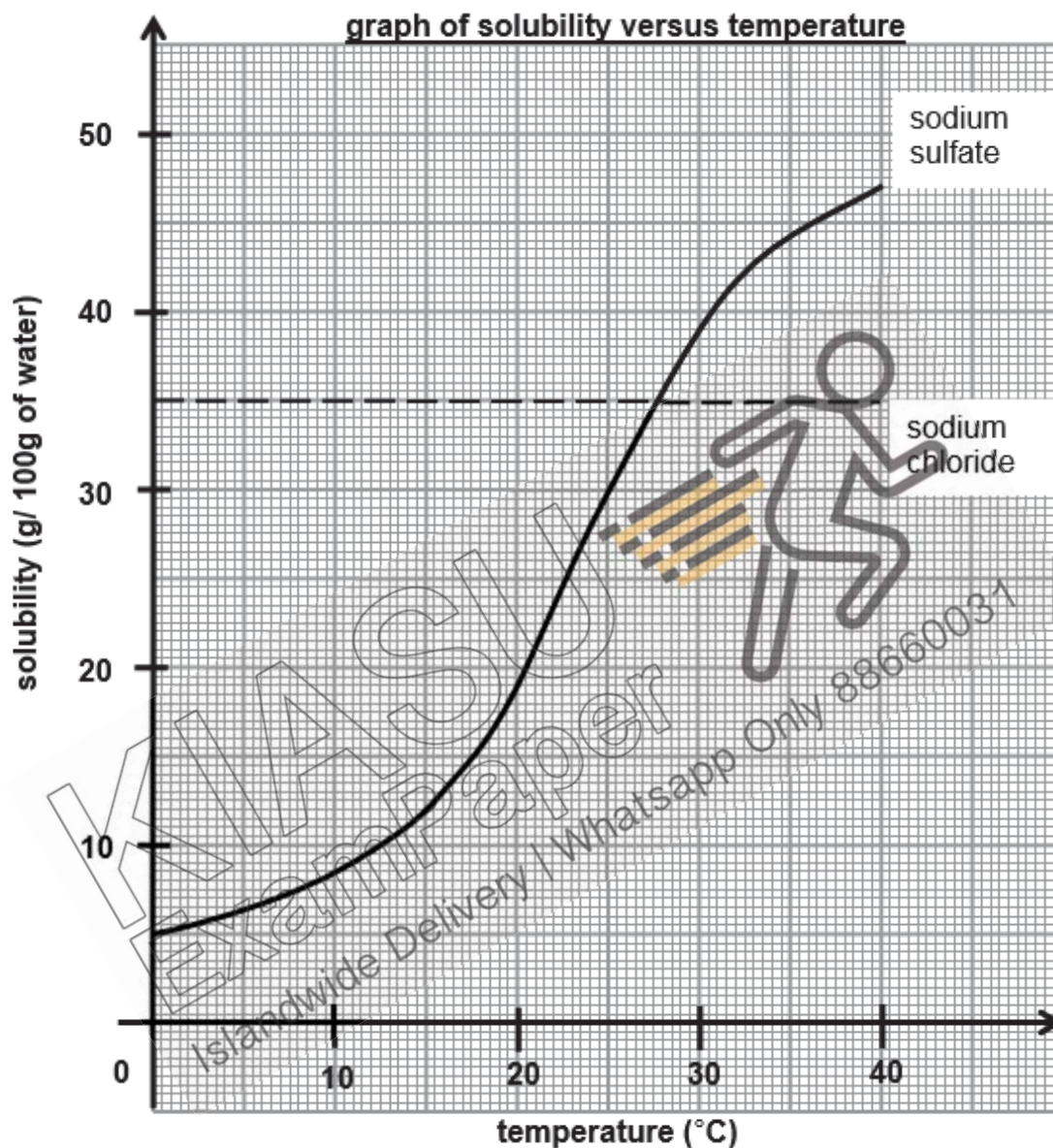
- (i) On the diagram, draw an arrow to indicate how the water moves between the root hair cell and the soil. [1]

- (ii) The root hair cell has a different shape to a typical plant cell.

Explain how this difference helps the root hair cell to absorb water. [2]

-- END OF PAPER --

The graph below shows how the solubilities of two solids change with temperature.



- (a) Name the science apparatus used to measure the volume of solvent used. [1]
- (b) Identify the solvent used in this experiment. [1]

- (c) Use the data provided and plot a graph to represent the solubility of ammonium sulfate on page 7. [2]

temperature (°C)	solubility (g/100g of water)
0	28
10	32
20	36
30	41.5
40	45

- (d) How does the solubility of ammonium sulfate change with temperature? [1]

- (e) At which temperature is the solubility of sodium sulfate and ammonium sulfate the same? Show your working clearly on your graph. [2]

- 1 A vernier caliper is used to measure the thickness of the rubber used to make the rubber tubing.

- (a) Figure A shows the reading taken using the internal jaw of the vernier caliper.

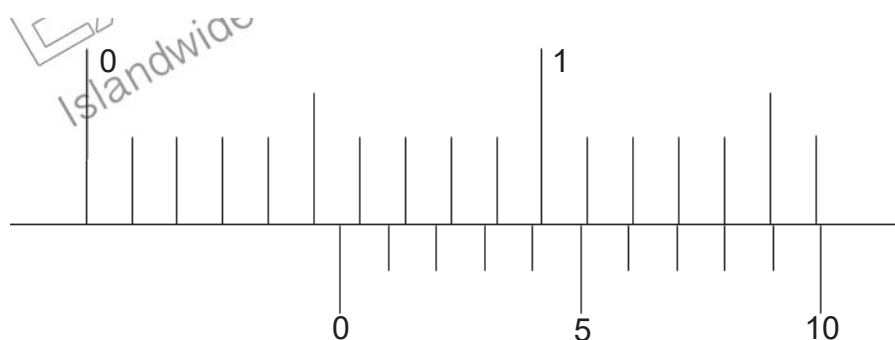


Figure A

What is the internal diameter of the rubber tubing? [1]

-
- (b) Figure B shows the reading taken using the outer jaw of the vernier caliper.

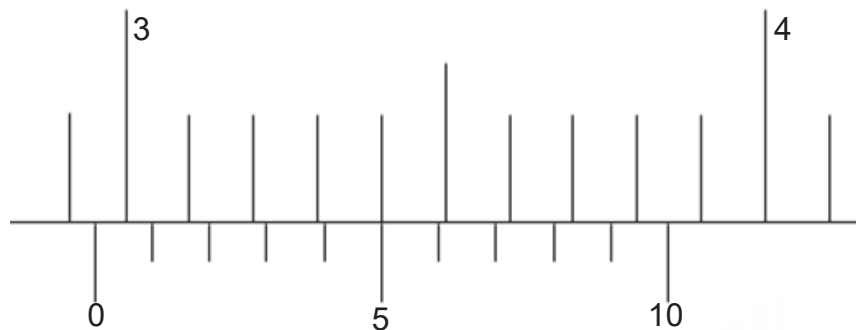


Figure B

What is the external diameter of the rubber tubing?

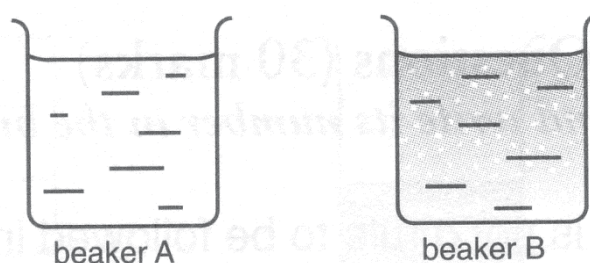
[1]

-
- (c) What is the thickness of the rubber tubing?

[1]

.....

Jane added three spoonfuls of copper sulfate powder to 60 cm³ of water in beaker A and three spoonfuls of chalk powder to 60 cm³ of water in beaker B. Study the diagram shown below carefully.



She let the mixture in beakers A and B stand for 10 minutes each.

- (a) What changes, if any, will she observe in beakers A and B?

[2]

There will be no change in beaker A. [1]

In beaker B, the particles of undissolved solids will begin to settle at the bottom of the beaker. [1]

(b) Jane thinks that mixture B is a suspension.

State two tests that she should conduct to confirm her hypothesis. [2]

Filter the mixture in beaker B. If solid particles are left on the filter paper, then the mixture in beaker b is a suspension

If the mixture in beaker B appears cloudy and she cannot see through it, then the mixture in beaker B is a suspension.

Allow the mixture in beaker B to stand for some time. If the solid particles settle at the bottom of the beaker, then the mixture in beaker B is a suspension.

[Any 2 differences]

Angela wanted to find the fastest way to dissolve 10 g of sodium chloride salt crystals in 20 cm ³ of water at room temperature (25 °C). Table 2 shows the results from her experiments.			
experiment	rate of stirring (oscillation/s)	size of salt grains	time taken for salt crystals to dissolve completely (s)
A	20	fine	?
B	10	coarse	30
C	15	coarse	21
D	20	coarse	12
(a)	Define the term ' <i>solubility</i> ' of a solute.		
(b)	State the dependent variable in this experiment.		
(c)	What can you conclude from experiments B , C and D ?		
(d)	Predict the time taken for the salt crystals to dissolve completely in experiment A . Give a reason for your answer.		

4 The properties of four solids **M**, **N**, **O** and **P** are shown in the table below.

solid	percentage composition by mass	broken down by chemical methods or separated by physical methods
M	constant	chemical methods

N	constant	cannot be broken down
O	varies	physical methods
P	constant	chemical methods

- (a) (i) Which solid(s) is/are a compound? Explain your answer. [3]

Solids M and P. [1]

Their **percentage composition by mass is constant** AND the
[1] **solids can be broken down by chemical methods [1]**

- (ii) One of the unknown solid is a magnesium metal. State which of the solid is the magnesium metal. Explain your answer. [2]

Solid N.[1]

Solid N **cannot be broken down by chemical methods. [1]**

- (b) A small sample of mixture consists of hydrogen gas (H_2) and hydrogen fluoride gas (HF). [3]

Describe three differences in properties between hydrogen fluoride gas and the mixture of hydrogen and hydrogen fluoride gas.

Properties	Hydrogen fluoride (Compound)	Hydrogen and hydrogen fluoride gas (Mixture)
Melting and boiling point	Fixed	Not fixed / over a range (Do not accept varies)
Composition by mass	Fixed	Not fixed
Separation	By chemical methods only	By physical means
Energy taken in or given out	Energy given off in the formation	No energy given off
(Any 3 differences)		

Fig 1 and Fig 2 shows two structures present in the plant. The structure in Fig 1 is part of the structure in Fig 2.			
 Fig 1 Fig 2 root hairs			
(a)	With reference to Fig 1,		[1]
	(i)	identify structure A.	
		Large, central vacuole; (reject: vacuole) [1]	
	(ii)	describe how this cell is adapted for absorption.	[1]
		Long protrusion/extension → increases SA: Vol ratio for faster absorption; [1]	
	(iii)	This cell is an example of a specialised cell. State one advantage of cell specialisation.	[1]
		Division of labour/cells become more efficient at their function/multiple functions can be performed at the same time in the organism; [1]	
(b)	Explain whether the structure in Fig 2 is a cell, tissue or organ, and state its function.		[2]
		The structure in Fig. 3.2 is an <u>organ</u> (ie. The root); [1] It is made up of a group of tissues working together to perform a specific function; Which is absorption of water and minerals; [1]	