Name:	Class	Index Number

Jurong West Secondary School

Mid-Year Examinations 2017

75

LOWER SECONDARY SCIENCE

Secondary One Express

05 May 2017

0800 – 0930

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs, tables or rough working.
Do not use staples, paper clips, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A
There are **twenty** questions. 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 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 question paper.

Section B and C
Answer **all** questions in the spaces provided. The number of marks is given in brackets [ ] at the end of each question or part question.

At the end of the examination, **hand in each section separately**.

After checking of answer script		
Checked by Student	**Signature**	**Date**

Section A (20 marks)

For each question, there are four possible answers, **A**, **B**, **C** and **D**.
Choose the one you consider correct and record your choice in **soft pencil** on the separate multiple choice answer sheet.

A1 A container with the labels **X** and **Y** pasted on it.
Which of the following correctly identifies **X** and **Y**?

X

Y

	X	Y
A	corrosive	irritant
B	irritant	corrosive
C	explosive	irritant
D	irritant	acutely toxic

A2 Which of the following statements about scientific method is **incorrect**?

A After an experiment, results are recorded and analysed.

B An experiment is created to test the hypothesis.

C Scientist shares the results of the experiment with others.

D Scientist can change his hypothesis after the experiment.

A3 A student discovered a new type of plant on his way back home. He did some research to find out more about the plant. Which scientific attitude does this student shows?

A curiosity

B integrity

C open-mindedness

D perseverance

A4 Which of the safety precautions should be taken when heating liquids in a test tube over a Bunsen flame?

I Wear safety goggles

II Wear gloves to hold the test tube

III Point the test tube towards people

IV Point the test tube away from people

A **I** and **III** only

B **I** and **IV** only

C **II** and **III** only

D **II** and **IV** only

A5 A teacher would like to conduct an experiment to investigate the rate to dissolve sugar in water of different temperatures.

Which of the following apparatus are needed?

I thermometer

II stopwatch

III glass rod

IV Bunsen burner

V micrometer

A **I, II, III and IV** only

B **I**, **III**, **IV** and **V** only

C **I**, **III** and **V** only

D **I**, **IV** and **V** only

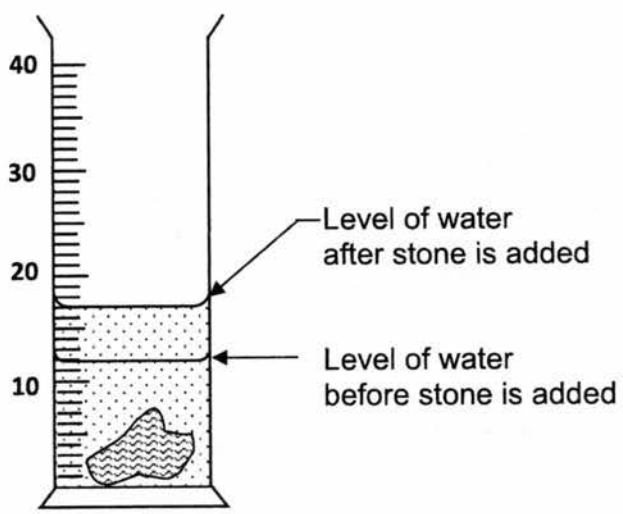
A6 Which of the instruments would you use for the following measurements?

(i) Diameter of a football

(ii) Mass of a bag of sand

	(i)	(ii)
A	vernier calipers	electronic mass balance
B	micrometer	weighing scale
C	metre rule	electronic mass balance
D	metre rule	weighing scale

A7 A stone is lowered into a measuring cylinder containing some water as shown below.



What is the volume of the stone?

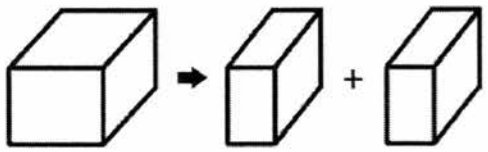
A 5 cm^3

B 12 cm^3

C 17 cm^3

D 29 cm^3

A8 A metal block has a density of 2.7 g/cm^3 and it is then cut into **two equal pieces.**



The density of the two smaller pieces will _____.

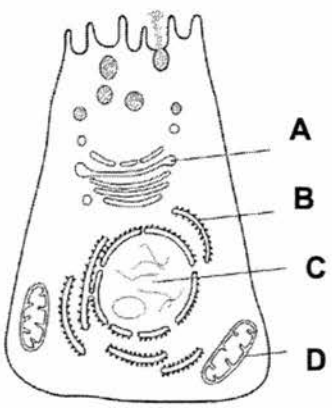
A be 2.7 g/cm^3

B be 1.35 g/cm^3

C less than 2.7 g/cm^3 and more than 1.35 g/cm^3

D less than 2.7 g/cm^3 and less than 1.35 g/cm^3

A9 The diagram below shows a cell.
Which of the following correctly identifies the organelle where aerobic respiration takes place?



A10 Why is it important to have division of labour in an organism?

A It improves the appearance of the organism.

B It improves the efficiency of the organism.

C It improves the relationship between two organisms.

D It improves the structure of the organism.

A11 Which of the following describes an organ?

A different organs working together

B different systems working together

C different tissues working together

D similar cells working together

A12 Which row in the table lists the structure from the simplest to the most complex?

	simplest → most complex			
A	Cells	Organs	Organ systems	Tissues
B	Cells	Tissues	Organs	Organ systems
C	Organ systems	Organs	Tissues	Cells
D	Tissues	Cells	Organs	Organ systems

A13 Which of the following represents the physical state of a material just below its melting point?

A solid

B liquid

C gas

D solid and liquid

A14 When a substance is heated, the particles in the substance _____.

A move slowly

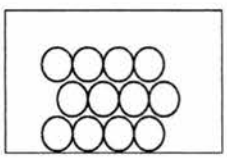
B move at the same speed

C move faster

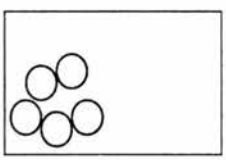
D do not move

A15 Which diagram shows the arrangement of atoms inside a gas jar containing helium gas?
(O – helium atom)

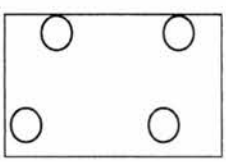
A



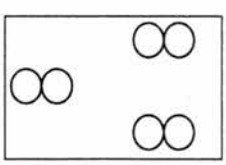
B



C



D



A16 Which of the following involves a change of state from liquid to gas?

A freezing

B condensation

C melting

D evaporation

A17 Which of the following represents an element?

A

B

C

D

A18 In a chemical reaction, element **X** combines with element **Y** to form compound **Z**.

Which statement is **not** true about compound **Z**?

A Elements **X** and **Y** can be separated from compound **Z** by physical means.

B It has properties that are different from elements **X** and **Y**.

C It is made up of two elements.

D It has fixed composition by mass.

A19 Which of the following statements about a suspension is **not** true?

A Cloudiness or insoluble particles are observed.

B Light can pass through a suspension easily.

C Particles settle at the bottom when a suspension is left to stand.

D Residue is obtained when a suspension is filtered.

A20 A student wants to dissolve some sugar in water to make a drink. Which of the following actions will slow down the rate of dissolving?

A using powdered sugar instead of sugar cubes

B using hot water instead of cold water

C stirring the water after sugar is added

D adding ice to the mixture to make it cold

Section B (35 marks)

Answer **all** the questions in this section in the spaces provided.
All essential workings must be shown.

B1 Hydrogen gas is formed when a metal reacts with an acid. A student wanted to test out her hypothesis that the greater the amount of metal used, the larger the volume of hydrogen gas produced.

(a) Identify the controlled, independent and dependent variable of this experiment.

(i) controlled variable .....[1]

(ii) independent variable .....[1]

(iii) dependent variable .....[1]

(b) **Fig. 1** shows the experimental set up to collect hydrogen gas in the experiment.

(i) Label the apparatus that are labelled **X** and **Y** in **Fig. 1**. [2]

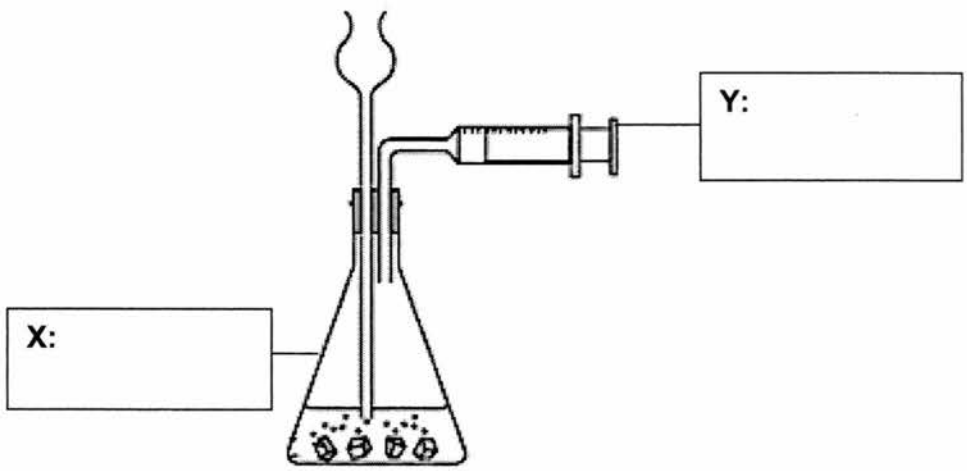


Fig. 1

(ii) In **Fig. 1**, draw a retort stand to hold the apparatus **Y**. [1]

(c) Suggest a way to ensure that the volume of gas collect is accurate.

.....[1]

B2 A student wanted to find out the thickness of the copper pipe to replace the pipes in the kitchen.

(a) **Fig. 2a** shows the reading of the external diameter of the copper pipe and **Fig. 2b** shows the reading of the inner diameter of the copper pipe taken using vernier calipers.

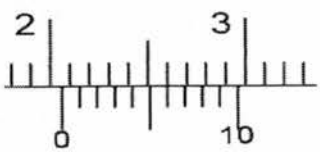


Fig. 2a

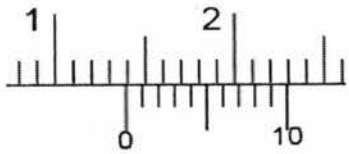


Fig. 2b

State the readings shown in **Fig. 2a** and **Fig. 2b.**

(i) External diameter: .....cm [1]

(ii) Internal diameter: .....cm [1]

(iii) Hence, calculate the thickness of the copper pipe.

.....[1]

(b) Three balls have densities of 0.7 g/cm^3, 1.4 g/cm^3 and 2.8 g/cm^3 respectively. They are immersed in four beakers carrying transparent liquids **A**, **B**, **C** and **D**. The liquids are of different densities. **Fig. 2c** shows the result for each of the liquids.

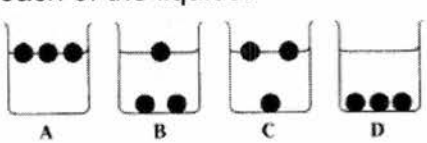


Fig. 2c

(i) Given that the density of liquid **C** is 2.0 g/cm^3, deduce the density of the ball sinking in the liquid. Explain how you derive at your answer.

.....

.....

.....[2]

(ii) One of the liquids **A**, **B** or **D** has a density of 3.0 g/cm^3. State the identity of the liquid and explain how you derive at your answer.

.....

.....[2]

B3 **Fig 3** shows two cells, **P** and **Q.**

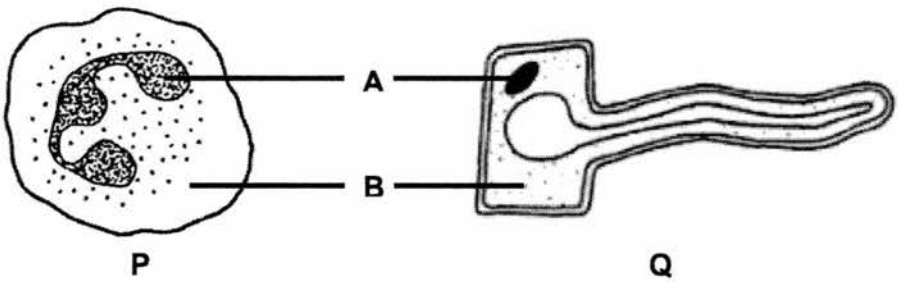


Fig 3

(a) Identify which of the cells **P** or **Q** is found in plants.

..... [1]

(b) Provide a reason for your answer in **(a)**.

.....

..... [1]

(c) Identify the structures **A** and **B** that are found in both cells **P** and **Q** and explain the functions of these structures.

(i) Name of structure **A**: .....

Function of structure **A**: .....

.....[2]

(ii) Name of structure **B**: .....

Function of structure **B**: .....

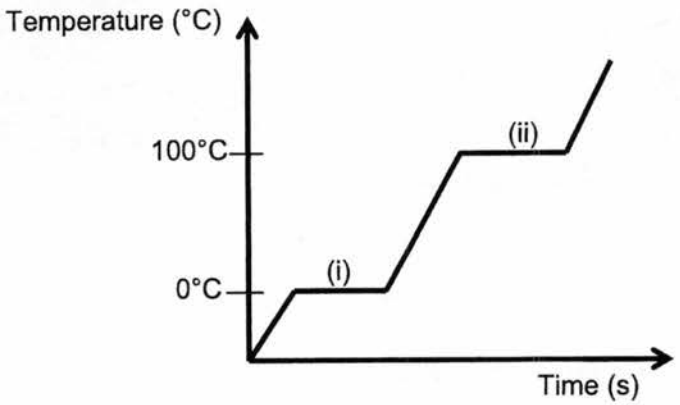
.....[2]

(d) Explain what does partially permeable means.

.....

..... [1]

B4 Refer to the graph for questions **(a)** to **(d)**.



(a) Name the processes occurring at (i) and (ii).

.....[2]

(b) Describe the change in the arrangement of the molecules at (i).

.....

.....

.....[2]

(c) Describe the change in the movement of the molecules at (ii).

.....

.....[2]

(d) Why were there no observable changes in temperature at (i)?

.....

.....[1]

B5 The table shows the composition of inhaled air and exhaled air.

Gas	Inhaled air (%)	Exhaled air (%)
Oxygen (O_2)	20	16
Nitrogen (N_2)	78	78
Carbon dioxide (CO_2)	0.03	4
Water vapour (H_2O)	variable	variable

(a) What is the definition of a mixture?

.....

..... [1]

(b) With the help of the table provided above, name **one** element that is found in air.

.....[1]

(c) With the help of the table provided above, name **one** compound that is found in air.

.....[1]

(d) Describe **two** physical properties that can be used to differentiate between a compound and a mixture.

.....

.....

.....

.....[2]

(e) In the box below, draw the particles that represent gas mixtures of molecule of an element and a compound. Label clearly the molecule of an element and a compound respectively.

[2]

Name:	Class	Index Number

Section C (20 marks)

Answer **all** the questions in this section in the spaces provided.
All essential workings must be shown.

C1 **(a)** Describe an experiment to determine the density of a small irregular-shaped solid. Identify the required apparatus for the experiment.

Apparatus

.....

..... [2]

(b) Suggest the steps taken to conduct the experiment to find out the density of the irregular solid using correct phrases/words.

Experimental Procedures

Step 1: Fill up .....

Step 2: Lower the .....

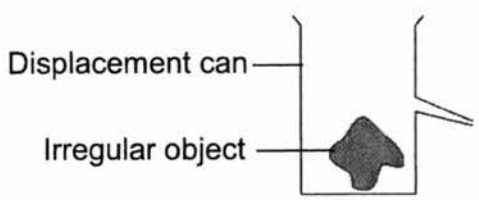
Step 3: Record the new ..... as V_2

Step 4: Measure the mass of the ..... using

a/an ..... and record its mass.

Step 5: Density is calculated. [2]

(c) Complete the set-up to show how volume of irregular solid is measured using a displacement can. Diagram of displacement can has been drawn.



[1]

(d) If the irregular solid floats on water, discuss how you would modify your experiment in **(a)**.

.....

.....

..... [2]

(e) After carrying out the experiment mention in part **(a)**, it was found that the mass of the small irregular-shaped solid is 680 g and the volume is 40 cm^3.

Calculate the density of the small irregular-shaped solid in g/cm^3. Show your working clearly.

Density=.....g/cm^3 [2]

(f) State **one** precaution to ensure accuracy of the results while conducting the experiment in part **(a)**.

.....

..... [1]

C2 **(a)** Root and leaf are parts of a plant. State the difference between these two parts if the cells from root and leaf are placed under a microscope.

..... [1]

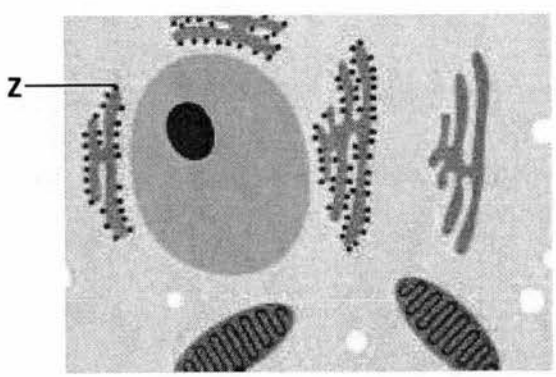
(b) Plants can make their own food but animals need to eat other organisms for energy. Explain why this is so.

.....

.....

..... [2]

(c) The plant cell is placed under electron microscope.



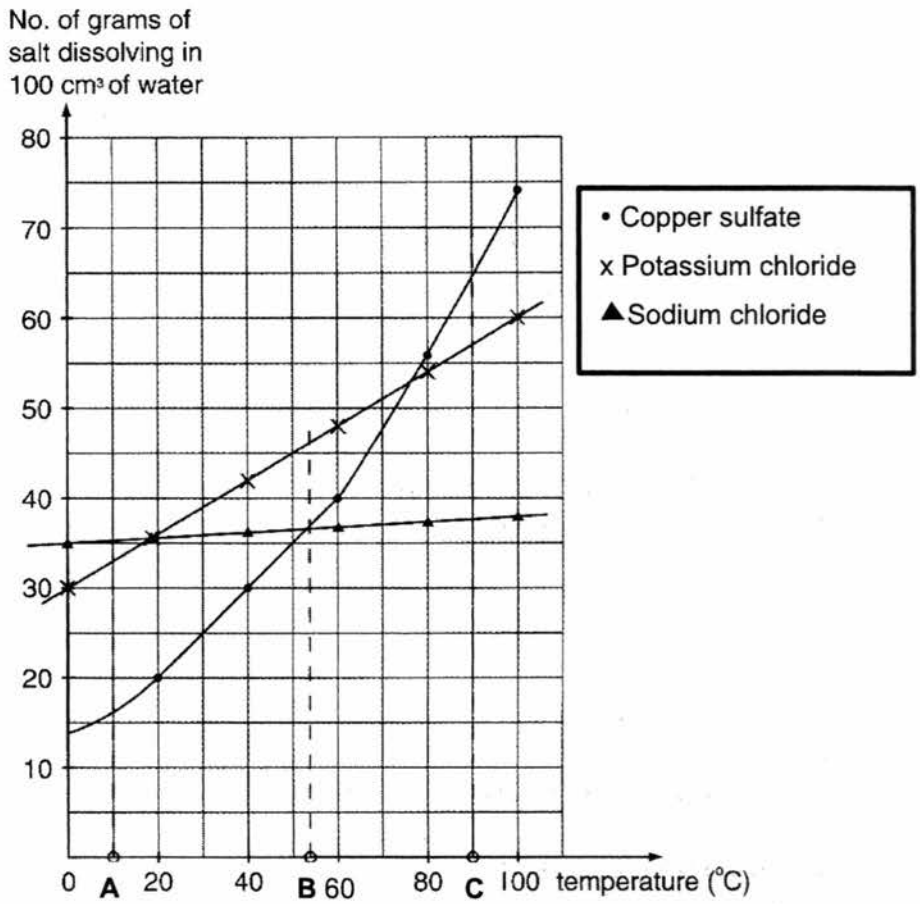
(i) Identify the organelle that is labelled **Z** in the diagram above.

..... [1]

(ii) What is the function of the organelle mention in **C2(c)(i)**?

..... [1]

C3 The diagram shows the solubility of three salts, namely: copper sulfate, potassium chloride and sodium chloride in 100 cm^3 of water.



(a) At 10 °C (point **A**),

(i) the **most** soluble salt is ..... [1]

(ii) the **least** soluble salt is ..... [1]

(b) Using the above diagram, predict the amount of potassium chloride that can dissolve in 100 cm^3 of water at 110 °C.

..... [1]

(c) Describe the solubility of the three salts at 53.5 °C (point **B**).

.....

.....

..... [2]

End of Pape~

The Periodic Table of Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	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 –		

Key

proton (atomic) number
atomic symbol
name
relative atomic mass

lanthanoids	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 europium 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 ytterbium 173	71 Lu lutetium 175
actinoids	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 –

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

Jurong West Secondary School

Mid-Year Examination 2017

Secondary 1 Express
SCIENCE

Total:75

Marking Scheme

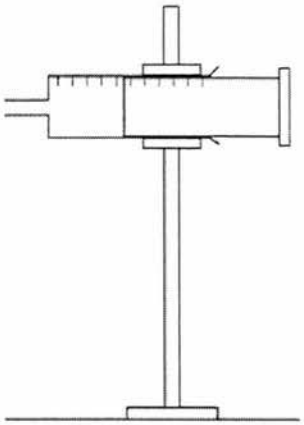
Section A

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

	Answer
11	C
12	B
13	A
14	C
15	C
16	D
17	A
18	A
19	B
20	D

Section B

Question		Suggested answer	Marks
B1	(a)(i)	Type of metal / volume of acids / type of acids/ temperature of acid Accepted answers: The same metal/amount of acid Rejected answers: Location/place of the experiment/metal/acid	1 mark
	(a)(ii)	Amount of metal Accepted answers: How much metal was used Rejected: Metal used/metal	1 mark
	(a) (iii)	Volume of hydrogen gas produced Accepted answers: Amount of hydrogen gas/amount of gas produced Rejected: Hydrogen/hydrogen gas produced	1 mark
	(b)(i)	Gas syringe Minor spelling errors accepted Rejected ans: Syringe/ gas string Conical flask Minor spelling errors accepted Rejected ans: Conel flask	1 mark 1 mark

	(b)(ii)	 *Accept if student draws almost similar diagram of retort stand.* Accepted diagrams: Retort stand with clamp positioned at the syringe not the plunger Rejected diagrams: Retort stand without clamp/ retort stand with clamp positioned in the plunger(will not allow the gas to be collected)	1 mark
	(c)	Do the experiment multiple times to get more than one reading. Accepted answers: Repeat the experiment/ Test the experiment again/try the experiment a few times Make sure no gas went into Y/gas syringe before the experiment Make sure the gas syringe is set at 0ml Rejected answers: See the volume of gas at eye level Seal any gaps There should be any gas in the conical flask before the experiment.	1 mark

B2	(a)(i)	2.06cm	1 mark

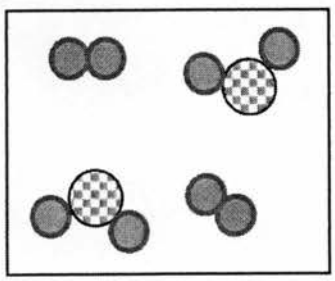
	(a)(ii)	1.39cm	1 mark
	(a)(iii)	2.06 – 1.39 = 0.67cm 0.67/2=0.34cm ECF allowed if answers for (a)(i) and (ii) are incorrect.	1 mark
	(b)(i)	Density of the ball is 2.8 g/cm^3 Density of the ball sinking in liquid C must be more than density of the liquid. Accepted answers: The liquid has a lower density than the ball. Density of the ball higher than 2.0g/cm^3. Rejected answers: The ball has higher density than water.(liquid C is not water)	1 mark 1 mark
	(b)(ii)	The liquid is A As the density of the liquid is greater than the densities of the 3 balls, it must be the liquid in which all the balls will float Accepted answers: The balls are less dense than the liquid/ 3.0g/cm^3/ball's density do not exceed 3.0g/cm^3 Liquid must have higher density than 2.8g/cm^3	1 mark 1 mark

B3	(a)	Q	1 mark
	(b)	Cell Q has cell wall but not cell P./ Cell Q has one large vacuole but cell P have many small vacuoles. Accepted answers: Plant cell have cell wall Rejected answers: Plant cell has chloroplast/ Q has chloroplast	1 mark
	(c)	(i) A: Structure: nucleus Function: Controls the activities of the cell such as cell growth. Accepted answers: Contains genetic information Contains DNA/chromosomes Controls the activities going inside the cell	1 mark 1 mark Penalised for wrong spelling of nucleus
		(ii) B: Structure: cytoplasm Function: Chemical reaction known as metabolism takes place here. Accepted answers: Chemical reactions takes place Chemical activities takes place/ most activities in the cell takes place Performs metabolism Metabolism takes place here Rejected answers: All chemical changes takes place Suspension of organelles/ organelles stored in here/ contain proteins	1 mark 1 mark Penalised for wrong spelling of cytoplasm

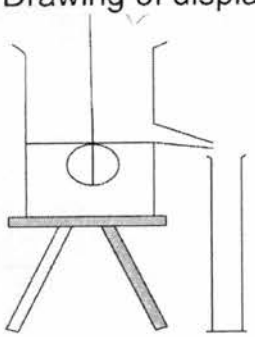
	(d)	It allows small substances to enter/leave/pass through the cells. Accepted answers: Only allow some/certain substances to pass through. Some particles are able to pass through Rejected answers: Allow some things/objects/items/materials to pass through	1 mark

B4	(a)	(i) melting (ii) boiling Reject: melting point Boiling point	1m 1m
	(b)	At (i), the particles are initially arranged in orderly and packed arrangement and held In fixed positions. As the particles gain energy/temperature increase, the particles are closely packed but not in an orderly/disorderly manner. Accepted answers: Arranged closely together in orderly arrangement(1m) Orderly to disorderly arrangement(1m)	1m 1m
	(c)	At (ii), the particles slide over one another/move in between each other and throughout the liquid, as it gains energy, the particles move in any direction (random) at high speed(rapidly). Accepted answers:	1m 1m

		Move freely and rapidly/ move fast and random (1m)	
	(d)	The heat energy taken in by the solid particles is used to <u>overcome</u> the <u>strong forces of attraction</u> holding them in fixed positions. Accepted answers: Break apart strong attractive forces of attraction/ overcome forces of attraction between molecules. Rejected answers: No observable change/ lessen forces of attraction between molecules	1m
B5	(a)	A mixture consists of **<u>two or more different elements or compounds not chemically combined together</u>**. Accepted answers: two or more different substances/different substances/ combination of element and/ or compounds not chemically combined/physically combined	1m
	(b)	Any one: nitrogen, oxygen Accepted N_2, O_2	1m
	(c)	Any one: carbon dioxide and water vapour Accepted CO_2, H_2O	1m
	(d)	Any two: • in mixture, constituents are not combined in fixed proportion by mass whereas in compound, constituents are combined in fixed proportion by mass • in mixture, the constituent gases can be separated by physical means but in compound, the molecules can be separated by chemical means. • A mixtures are impure substances, they melt and boil over a range of temperatures, but compound are pure substances that boils at a fixed temperature. Accepted answers:	2m

		A mixture does not have fixed proportion/ratio of its components but a compounds has. Compound is formed by heat change but mixture is formed without a heat change	
	(e)		1m for molecule of element with label 1m for molecule of compound with label -1 mark if no label

Section C

C1	(a)	Apparatus: • electronic (mass) balance or beam balance • measuring cylinder **OR** displacement can AND measuring cylinder	[1] [1]
	(b)	Experimental Procedure Step 1: Fill up the **measuring cylinder**(with water) to V_1 cm^3. Step 2: lower the (irregular)**solid** (in the measuring cylinder of water.) Step 3: Record the new **volume** as V_2 cm^3 Step 4: Measure the mass of the (irregular) **solid** using a **beam balance**/an **electronic balance** and record its mass. Step 5: Density is calculated. ECF if wrong measuring apparatus mentioned in (a) is used in answers	All correct – 2 marks 3-4 correct – 1 mark 2 and below – no marks
	(c)	Drawing of displacement can set-up to find volume. 	[1] No need tripod stand. Must have both correct **water level** and **measuring cylinder** to get the mark
	(d)	Select a sinker/rock and find its volume V_3 by calculating the volume of water displaced in the cylinder.	[1] – find volume of sinker

		Attach this sinker/rock to the irregular solid and find the volume of water displaced in the cylinder V_4. Thus, volume of the irregular solid is obtained by calculating $V_4 - V_3$. **OR** Use an apparatus to push down the object and deduct the volume of the apparatus from the final volume **REJECT** use a heavier sinker without elaboration of the sinker being able to cause the irregular solid to sink	[1] – find volume of sinker with irregular object and deduct the volume [1] [1]
	(e)	$D = \frac{M}{V} = \frac{680g}{40cm^3} = 17g/cm^3$	[1] – method [1] – correct
	(f)	• Read the volume readings at eye level to avoid parallax error. • Ensure to tare the electronic balance. • No wind is blowing on the electronic balance	Any possible answer. [1] Reject repeats and constant water volume since experiment did not mention repeats

C2	(a)	Root cell does not have chloroplast while leaf cell have chloroplasts.	[1]
	(b)	Plant cells have **chloroplast/chlorophyll** which **absorbs energy** from the sun to make food during photosynthesis. Animal cells **do not have chloroplast** to make food, therefore animals need to eat other organisms to obtain energy. **OR** Animals can move around to obtain their own food. Plants cannot move around therefore have to depend on photosynthesis to make their own food	[1] [1] [1] [1]
	(c)(i)	Ribosomes	[1] Penalise for wrong spelling
	(c)(ii)	They are needed to **make/produce/synthesise proteins** in the cell.	[1]

C3	(a)	(i) Sodium chloride	[1]
		(ii) Copper sulfate	[1] Penalise for wrong spelling
	(b)	63g (±1g)	[1]
	(c)	Potassium chloride is more soluble than the copper sulfate and sodium chloride/Potassium chloride is the most soluble	[1]
		The solubility of copper sulfate and sodium chloride is the same at point B.	[1]