KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL
2016 Mid-Year Examination
Secondary 1 Express

NAME

CLASS

INDEX NUMBER

LOWER SECONDARY SCIENCE

5 May 2016

2 hours

Additional Materials: Multiple Choice Answer Sheet

Setter: Ms. Low Wai Kwan

READ THESE INSTRUCTIONS FIRST

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

This paper consists of 3 sections.

Section A consists of 30 multiple-choice questions.
Answer **all** questions.
For each question, choose the most appropriate answer and shade the letter corresponding to the answer in soft 2B pencil on the separate Multiple Choice Answer Sheet.

Section B consists of 9 structured questions.
Answer **all** the questions in dark blue or black pen in the space provided on the Question Paper.

Section C consists of 3 free response questions.
Answer **all** the questions in dark blue or black pen in the space provided on the Question Paper.

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

A copy of the Periodic Table is printed on page 24.

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

SECTION A (30 marks)

1 The diagram shown below is found on a storage box.

Which of the following substances is likely to be stored in the box?

A Alcohol

B Concentrated sulfuric acid

C Frozen samples of Ebola virus

D Radioactive uranium

2 As a scientist, which of the following steps should you take when your experimental results do not support your hypothesis?

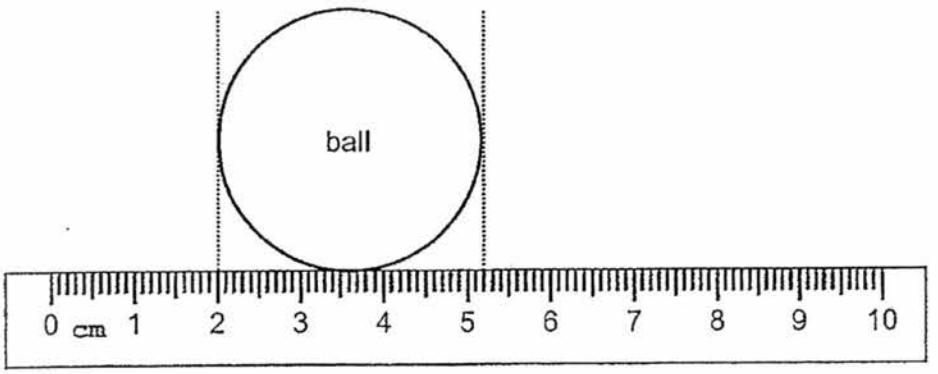
A Change the experimental results so as to explain the original hypothesis.

B Discard the original observations.

C Make another new observation.

D Refine the hypothesis and test it again.

3 What is the radius of the ball shown below?



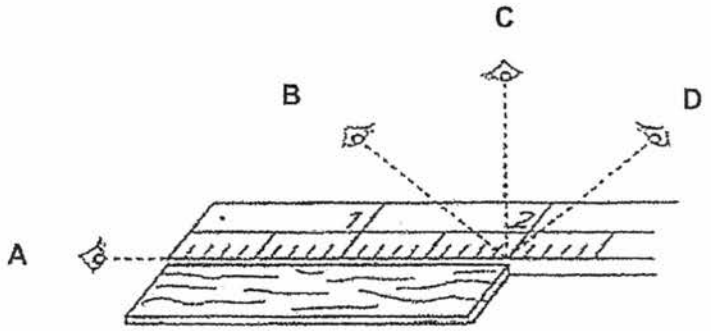
A 1.6 cm

B 2.6 cm

C 3.2 cm

D 5.2 cm

4 Which one of the following positions labelled **A** to **D** should the eye be placed to obtain an accurate reading?



5 Which of the following can only be used to measure a fixed volume of liquid?

A beaker
B burette
C pipette
D measuring cylinder

6 What is the time shown on the digital stopwatch?

A 12 h 38 min 56 s
B 12 h 38.56 min
C 12 h 38.56 s
D 12 min 38.56 s

[Turn over

7 Which of the following relationships is correct?

A 0.5 g= 50 mg

B 1 g/cm^3 = 0.001 kg/m^3

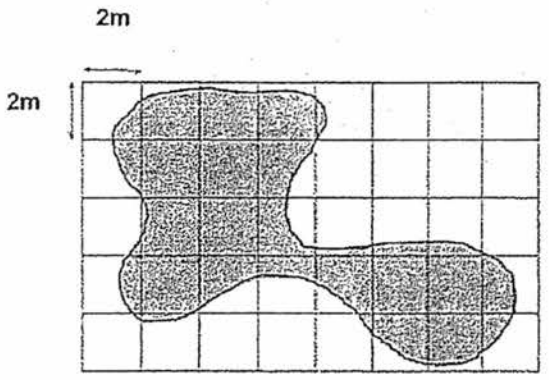
C 1 m^3 = 1000000 cm^3

D 1 t = 100 kg

8 Which row correctly matches the S.I. units to the physical quantities?

	mass	temperature	time
A	kilogram	degree Celsius	hour
B	kilogram	Kelvin	second
C	gram	degree Celsius	hour
D	gram	Kelvin	second

9 The diagram shows a photo of a lake. What is the surface area of the lake?



What is the estimated area of the lake?

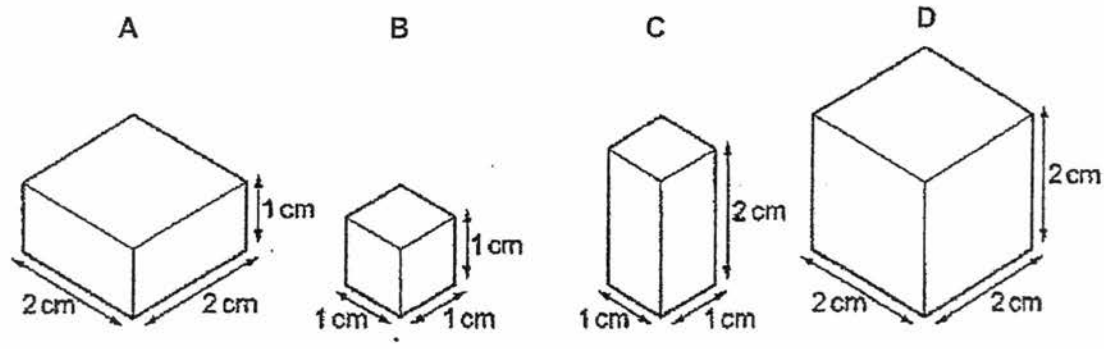
A 16 m^2

B 32 m^2

C 48 m^2

D 64 m^2

10 Each block shown below has the same mass. Which block has the greatest density?



11 The density of a piece of glass pane is 2500 kg/m^3. It is carefully cut into two equal pieces. The density of each piece of the cut glass is

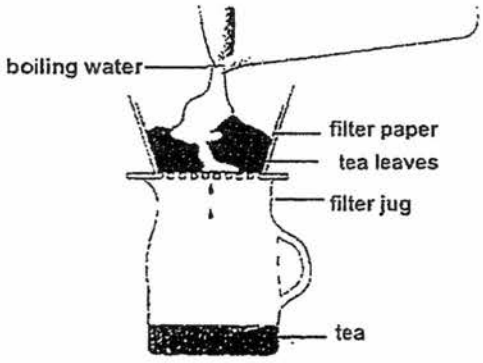
A 625 kg/m^3

B 1250 kg/m^3

C 2500 kg/m^3

D 5000 kg/m^3

12 The diagram shows a separation technique used to obtain tea.



Which one of the following is correct?

	tea	tea leaves	boiling water
A	filtrate	residue	solution
B	filtrate	residue	solvent
C	solution	residue	solvent
D	solution	solute	solvent

[Turn over

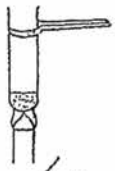
13 On 21st June 2013, the Pollutant Standard Index (PSI) hit a record high of 401 due to the haze. Singaporeans were advised to wear a N95 mask when they are outdoors to ensure that the pollutants in the air do not enter their respiratory system.

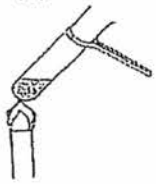
Which separation technique best describes the way the mask works?

A chromatography
B distillation
C evaporation
D filtration

14 Which one of the following diagrams shows the correct way of heating water in a test tube?

A 

B 

C 

D 

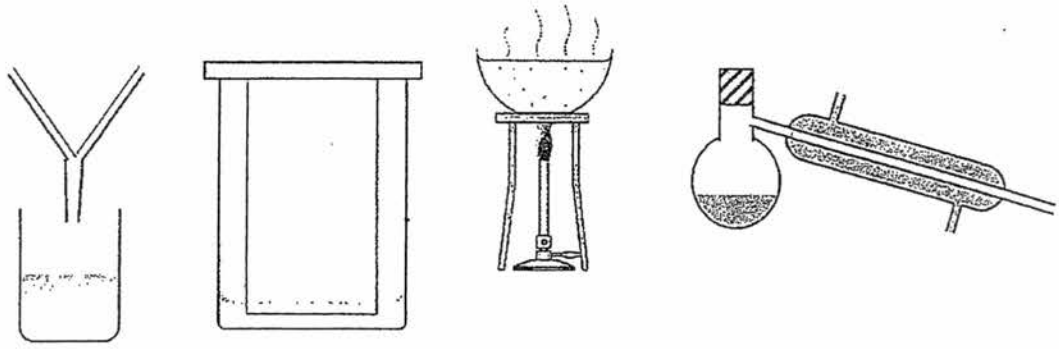
15 How many elements are there in the compound $Co_4(CO)_{12}$?

A 2
B 3
C 4
D 5

16 A solution looks different from a suspension because

A a solution does not allow light to pass through.
B a solution is made up of two parts, the solvent and the insoluble solid.
C a solution looks uniform throughout in its appearance.
D the components of a solution can be separated by filtration.

17 Compound **Q** melts at 78°C and boils at 124°C and is insoluble in water. Which apparatus can be used to obtain pure **Q** from a mixture of **Q** and water.

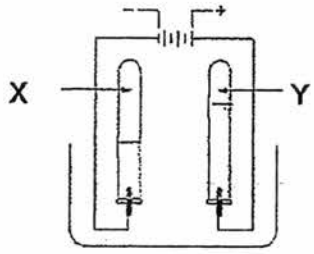


A **B** **C** **D**

18 Which of the following shows an element, a compound and a mixture?

	element	compound	mixture
A	CO	magnesium oxide	milk
B	Hg	$C_6H_{12}O_6$	fizzy drink
C	K	bronze	Sn
D	N_2	H_2O	air

19 The diagram shows electricity being passed into some water.



	X	Y
A	Air	Oxygen
B	Hydrogen	Oxygen
C	Carbon dioxide	Hydrogen
D	Oxygen	Hydrogen

[Turn over

20 Magnesium burns brightly in air to form a compound called

A magnesium chloride.
B magnesium oxide.
C magnesium sulfate.
D magnesium sulfide.

21 The function of xylem is to

A absorb water and dissolved mineral salts from the soil.
B transport food made in the leaves to all parts of the plant.
C transport water and dissolved mineral salts.
D store food made by the leaves.

22 Which feature of the xylem vessel makes it suitable for support?

A elongated shape
B hollow
C lignified walls
D no cytoplasm

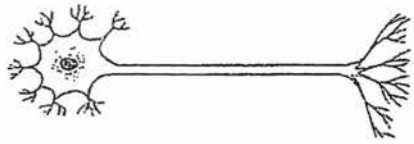
23 Which of the following describes an organ?

A different organs working together
B different systems working together
C different tissues working together
D similar cells working together

24 Which of the following are correctly arranged from the smallest to the largest?

	smallest → largest			
A	gene	chromosome	nucleus	cell
B	chromosome	gene	nucleus	cell
C	cell	nucleus	chromosome	gene
D	nucleus	cell	gene	chromosome

25 The diagram below shows one type of cell.



Identify this cell and the organ system in which this cell can be found.

	cell type	organ system
A	epithelial cell	digestive system
B	nerve cell	nervous system
C	muscle cell	muscular system
D	blood cell	circulatory system

26 Which one of the following organisms does **not** have levels of organisation within its body?

A ant
B coconut tree
C Euglena
D human being

27 A plant tissue that protects the plant against injury is

A the epidermal tissue.
B the epithelial tissue.
C the phloem.
D the xylem.

[Turn over

28 The leaves, stems and roots make up the plant

A reproductive system.
B shoot system.
C support system.
D transport system.

29 If the eyepiece of a microscope is 10 X and the objective lens is set at 100 X, then what is the total magnification of the microscope?

A 90 X
B 110 X
C 200 X
D 1000 X

30 Which of the following is an organelle?

A a chloroplast
B a nerve
C blood
D muscles

Name: _____ ( ) Class: _____

SECTION B (40 marks)

Answer **ALL** *questions in this section.*
Show your working and write your answers in the space provided.

1 Fig. 1.1 shows a set up for titration.

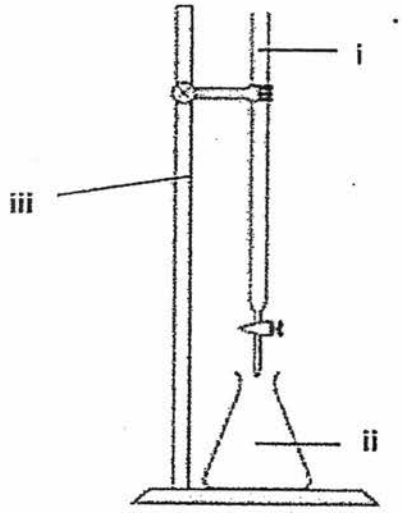


Fig. 1.1

(a) Label the apparatus shown in Fig. 1.1.

(i) .....

(ii) .....

(iii) ..... [3]

(b) State the degree of accuracy of apparatus **(i)**.

..... [1]

[Turn over

2 John wants to find out which type of fertilisers will enable his plants to grow faster and healthier. He suggests that brand **R** should be the better fertiliser compared to the rest. Table 2.1 shows the brand and amount of fertilisers used, the type of plants used and the growth in height of the plants.

Table 2.1

Brand of fertilisers	Amount of fertiliser used (g)	Type of plants used in experiment	Type of soil used	Growth in height of plants in 2 weeks (cm)
P	3.0	Bougainvilla	Peat	4.4
Q	3.4	Ixora	Peat	4.0
R	3.2	Chili	Peat	5.9
S	3.1	Rose	Peat	2.8

(a) What is John's hypothesis in the experiment?

..... [1]

(b) State one factor that he has kept constant in the experiment.

..... [1]

(c) Is the experiment fair? Explain your answer.

.....

..... [1]

(d) State the dependent variable.

..... [1]

3 Fig. 3.1 shows the cross-section of a hollow pipe. A pair of vernier calipers is used to measure the internal diameter and external diameter of the pipe.

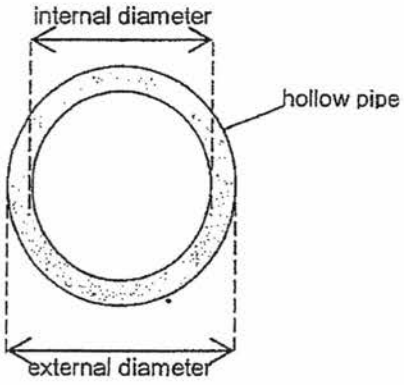


Fig. 3.1

The readings in Fig. 3.2 and Fig. 3.3 are the readings taken of the external and internal diameter respectively.
Write down the readings of the vernier calipers shown in these two diagrams.

(a) (i)

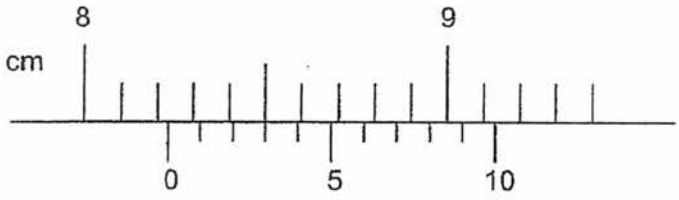


Fig. 3.2

Answer:..... [1]

(ii)

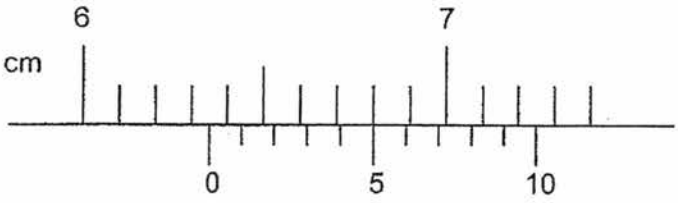


Fig. 3.3

Answer:..... [1]

(b) Using your answers in part **(a)**, calculate the thickness of the pipe wall.

Answer:..... [1]

[Turn over

4 Given that the density of the stone is 2.5 g/cm^3, what is the mass of the stone?

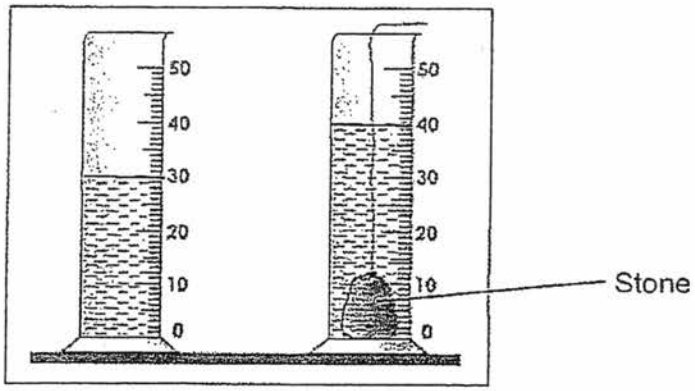


Fig. 4.1

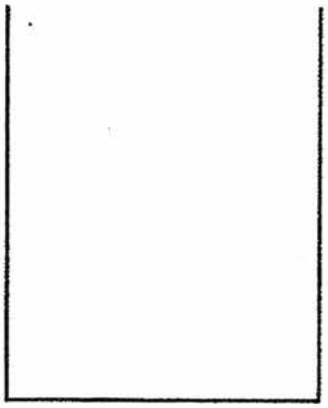
Answer:..... [2]

5 John poured equal volume of mercury, water and oil into a container and dropped 3 pieces of solid into the same container. The densities of the substances are listed below:

Table 5.1

Substance	Density (kg/m^3)	Legend
Mercury	13600	
Water	1000	
Oil	900	
Iron nail	7860	
Styrofoam ball	950	
Silver ring	10490	

Using the legend given in Table 5.1, draw and label clearly to show how the liquids and solids will be arranged in the container.



[3]

6 (a) An engine component is made of an alloy containing iron and copper. It is made by mixing molten iron and molten copper together and then left to solidify. The density of iron is 7.9 g/cm^3 and the density of copper is 8.9 g/cm^3.

(i) If 58.0 cm^3 of molten iron and 22.0 cm^3 of molten copper are used in this process, determine the masses of copper and iron used.

Answer:..... [2]

(ii) Calculate the density of the alloy formed.

Answer:..... [3]

7 (a) What is meant by the term 'element'?

.....

..... [1]

(b) Explain why sugar is not an element.

.....

..... [2]

(c) With reference to the Periodic Table on page 24, answer the following questions.

(i) Name any two elements that are in the same group as Beryllium.

..... [1]

(ii) Give a reason why these two elements mentioned in your answer to (i) are placed in the same group.

..... [1]

[Turn over

(iii) Name a metallic element which exists in liquid state at room temperature.

..... [1]

(iv) Write down the chemical symbol of the element with atomic number 56.

..... [1]

(v) Write down the name of the element found in Group IV and Period 3.

..... [1]

8 Fig. 8.1 shows the solubility of some solids in water.

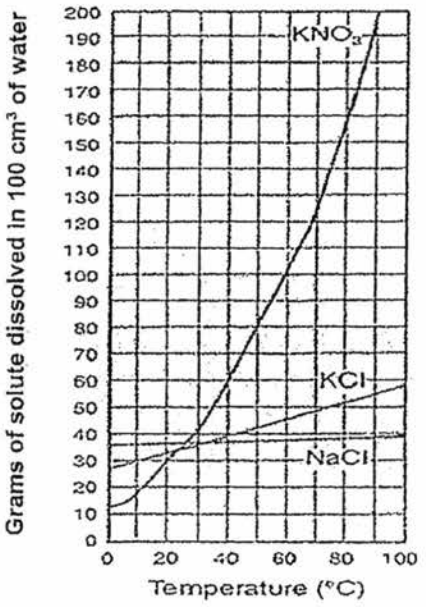


Fig. 8.1

(a) State the general relationship between solubility of the solids and temperature of water.

..... [1]

(b) Which one of the solid compounds has a near constant solubility from 40 °C to 100 °C?

..... [1]

(c) Which substance has the highest solubility at 40 °C? State its solubility at 40 °C.

..... [1]

(d) State the temperature at which all three solutes have approximately the same solubility.

..... [1]

(e) What would happen if 120 g of potassium nitrate (KNO_3) is added to 100 cm^3 of water at 50 °C?

..... [1]

(f) " By grinding sodium chloride finely, we can increase its solubility "
Comment on the above statement.

.....

..... [2]

9 **(a)** Label the four parts of the Bunsen burner shown in Fig. 9.1.

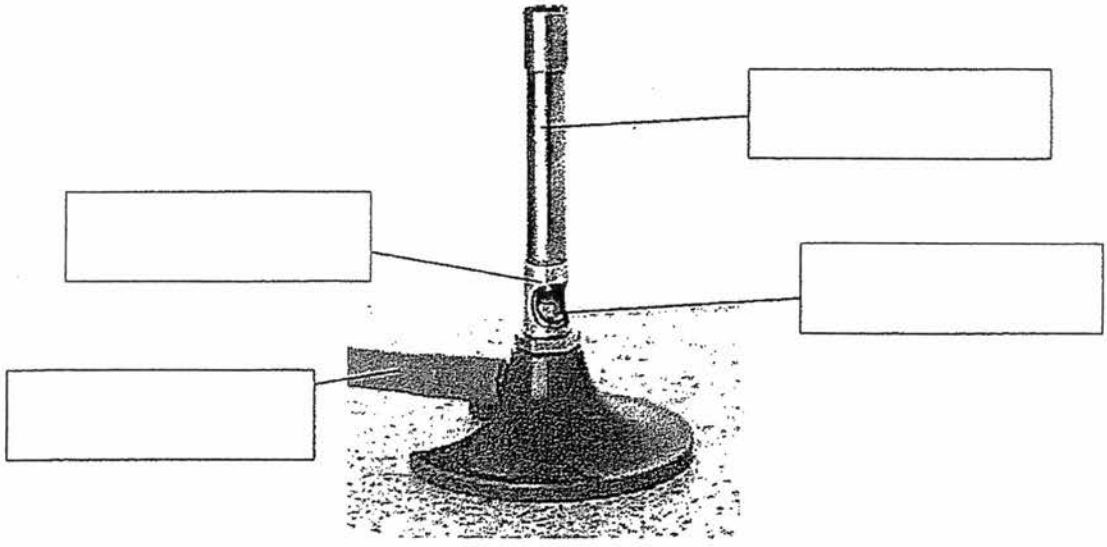


Fig. 9.1

[2]

(b) State two differences between a luminous flame and a non-luminous flame?

.....

..... [2]

[Turn over

Name: _____ ( ) Class: _____

SECTION C (30 marks)

Each question carries **10 marks.**
Answer **all** *the questions in this section.*
Show your working and write your answers on the lines provided.

10 (a) A biological sample from Mars was sent back to Earth for analysis. Fig.10.1 shows one of the cells of the sample as it is viewed under a light microscope.

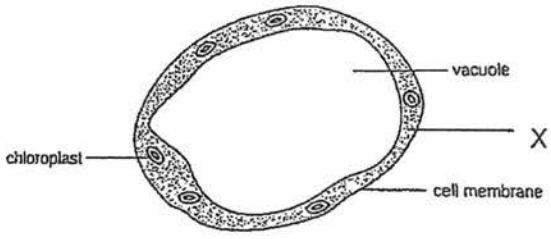


Fig 10.1

(i) Suggest **two** reasons why it is difficult to classify this cell as an animal or a plant cell.

.....

.....

..... [2]

(ii) Suggest why **X** is important to the survival of the cell.

..... [1]

(iii) Explain why this cell may not be able to undergo cell division.

..... [1]

(b) (i) Name three main organs that make up the Human Circulatory System.

..... [1]

(ii) Using the Human Circulatory System as an example, explain how division of labor in multicellular organisms is carried out.

.....

.....

..... [2]

(ii) State the advantage of division of labour in multicellular organisms.

.....

..... [1]

(c) Describe any one essential feature of red blood cells. Relate this feature to its function.

.....

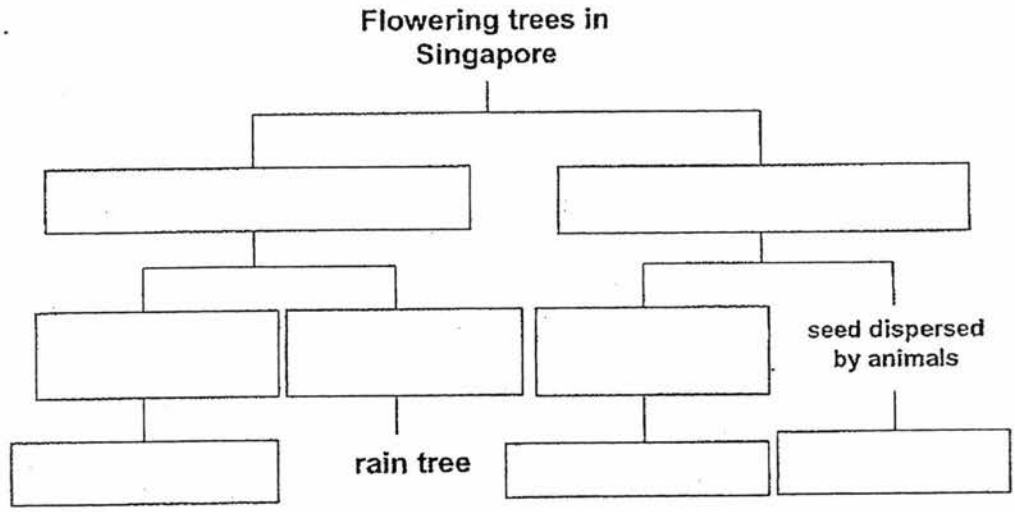
.....

..... [2]

11 (a) Varun was given the following information about four common trees found in Singapore and was asked to organise the plants using a dichotomous key.

The rain tree is a flowering tree with an umbrella-shaped crown and its seeds are dispersed by animals. The trumpet tree is a flowering tree with a conical crown and the seeds are dispersed by splitting. The tembusu tree is a flowering tree with a conical crown and the seeds are dispersed .by animals. The saga tree is a flowering tree with an umbrella-shaped crown and its seeds are dispersed by splitting.

Using the information given, complete the dichotomous key to classify the trees correctly.



[4]

11 (b) John bought a few sacks of sea salt and some fishes that were placed in a tightly knotted plastic bag filled with water. As he was about to untie the knot to release the fishes into a deep tank of water, the plastic bag slipped and fell into the bottom of the tank.

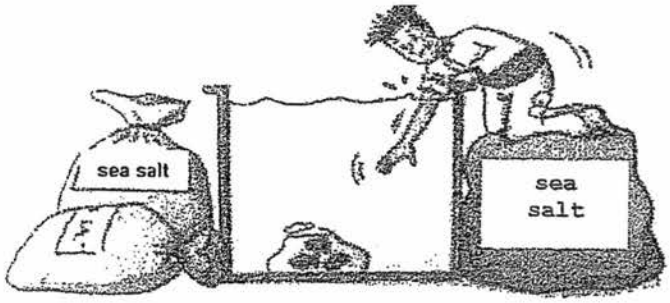


Fig.11.1

His arms are not long enough to reach the bag and he has no tools with him. What can John do to get the bag out of the tank?

.....

.....

..... [2]

(c) Fig.11.2 shows the stages (A to G) in water treatment.

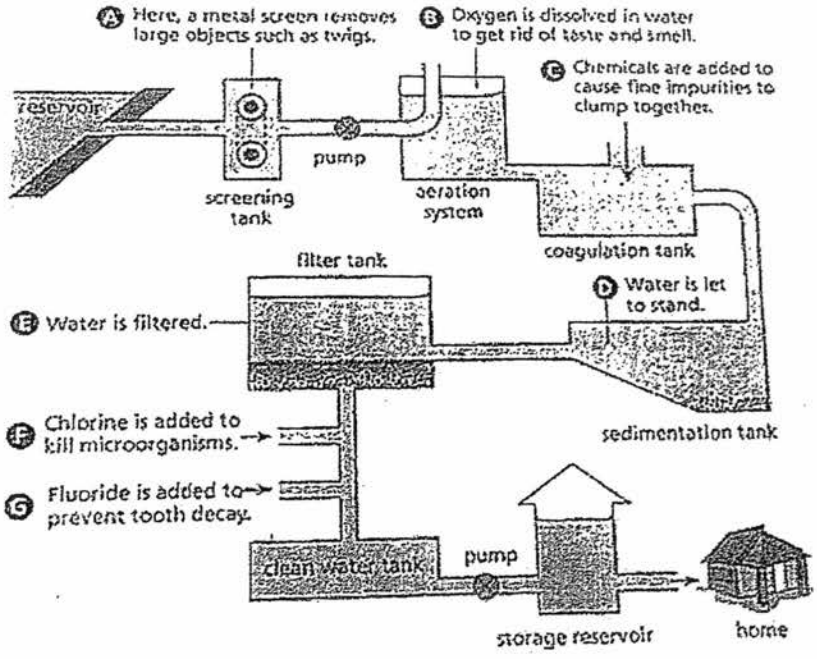


Fig.11.2

[Turn over

(i) List any two stages that show that water from the reservoir is a suspension.

..... [1]

(ii) Explain your answer in **(i)**.

.....

..... [2]

(iii) Is water from the tap pure? Explain your answer.

.....

..... [1]

12 **(a)** **(i)** Name the two elements that make up table salt.

..... [1]

(ii) "The properties of a compound are usually different from the elements it is made up of "

Explain the above statement using table salt as an example.

.....

.....

.....

.....

.....

..... [3]

(iii) State another property of compounds.

.....

..... [1]

(b) Paper chromatography can be used to identify the dyes used to colour food and drinks. Fig.12.1 shows the result of an experiment.

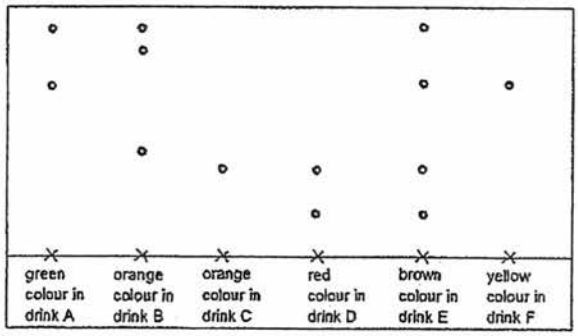


Fig.12.1

(i) Which colour(s) are pure dyes?

..... [1]

(ii) How many different components is the orange colour of drink **B** made up of?

..... [1]

(iii) State which colours can be used to produce the brown colour in drink E.

..... [1]

(iv) State one reason why chromatography is suitable for identifying the dyes used in food.

.....

..... [1]

(v) Explain why the start line was drawn using a pencil.

.....

..... [1]

END OF PAPER

The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	64 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	– Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La lanthanum 57 *	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	– Po polonium 84	– At astatine 85	– Rn radon 86
– Fr francium 87	– Ra radium 88	– Ac actinium 89 †															

*58-71 Lanthanoid series

†90-103 Actinoid series

140 Ce cerium 58	141 Pr praseodymium 59	144 Nd neodymium 60	– Pm promethium 61	150 Sm samarium 62	152 Eu europium 63	157 Gd gadolinium 64	159 Tb terbium 65	162 Dy dysprosium 66	165 Ho holmium 67	167 Er erbium 68	169 Tm thulium 69	173 Yb ytterbium 70	175 Lu lutetium 71
232 Th thorium 90	– Pa protactinium 91	238 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

Key: a = X = atomic symbol, b = proton (atomic) number

a = relative atomic mass

b = proton (atomic) number

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

KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL

SECONDARY ONE EXPRESS
GENERAL SCIENCE
MID YEAR EXAMINATION 2016
Answer Scheme

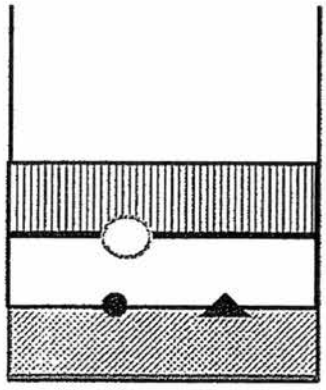
Section A – Multiple Choice Questions (30 marks)

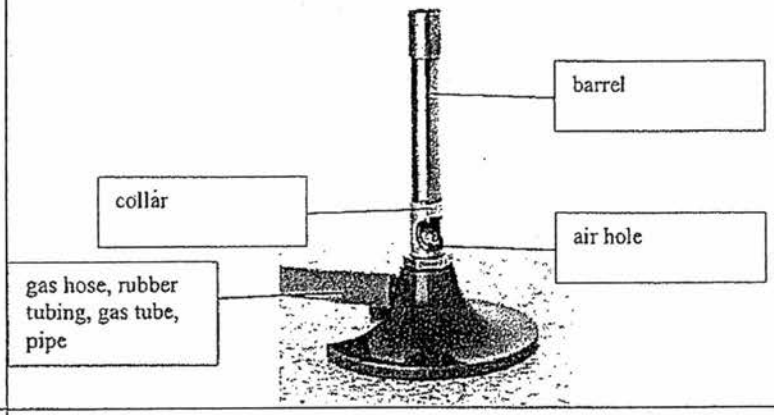
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
C	D	A	C	C	D	C	B	D	B

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

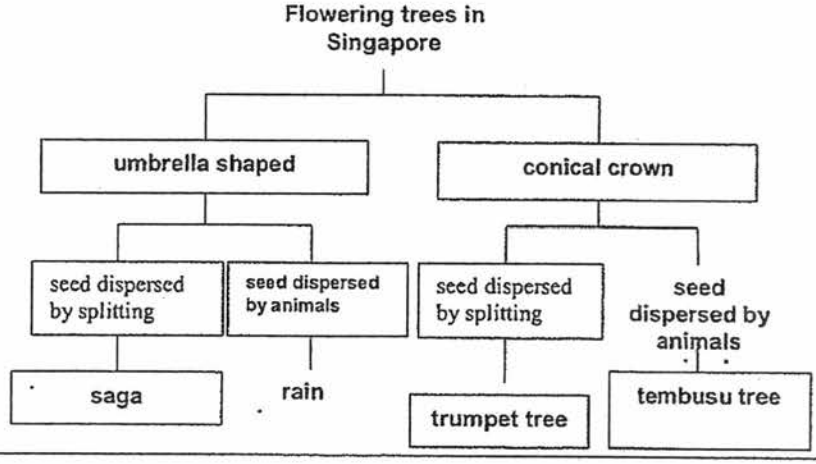
Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
C	C	C	A	B	C	A	D	D	A

Section B Structured Questions (40 marks)

1	ai	Burette	1
	aii	conical flask	1
	aiii	retort stand	1
	b	correct to 0.1 cm^3	1
			Total: 4m
2	a	Brand R is the better fertilizer that allows plants to grow faster and healthier.	1
	b	Type of soil	1
	c	No.The amount of fertilizer used and the type of plants used are different	1
	d	The growth in height	1
			Total:4m
3	ai	8.23 cm [0m if no units]	1
	aii	6.35 cm [0m if no units]	1
	a iii	(8.23-6.35)/2=1.88/2=0.94 cm	1
			Total: 3m
4		volume= 40-30=10 cm^3 [1]	2
		mass= density x volume [1/2]	
		mass = 10x 2.5=25 g [1/2]	
			Total: 2m
5			½ mark for each correct position 1/2x6=3
			Total: 3m

6	a (i)	mass of copper= 22x 8.9= 195.8 g mass of iron= 58x7.9= 458.2 g	1 1
	a (ii)	total volume= 58+22=80 cm^3 total mass=458.2+195.8=654 g Density of alloy= 654/80= 8.175 g/cm^3	1 1 1
			Total: 5m
7	a	An element is a substance which cannot be broken down into two or more simpler substances by chemical methods. Or Matter in its simplest form.	1
	b	Sugar is made up of carbon, hydrogen and oxygen chemically combined together	2
	c (i)	Mg,Ca,Sr, Ba,Ra (any two)	1
	c (ii)	They have similar chemical properties	1
	c(iii)	Mercury, Gallium	1
	c (iv)	Ba	1
	c(v)	Silicon	1
			Total: 8m
8	a	The solubility of solids increases with the temperature of water	1
	b	NaCl	1
	c	KNO_3, 60 g/ 100cm^3 of water	1
	d	23-27 °C.	1
	e	40 g will not be dissolved/ A suspension is formed.	1
	f	This statement is wrong. By grinding sodium chloride finely only helps to increase its rate of dissolving.	1 1
			Total: 7m
9	a		½ x4=2
9	b	a luminous flame is orange in colour/ less hot/ produce more soot/not steady. a non-luminous flame is light blue in colour/ hotter/ produce less soot/ steady.	1 1
			Total: 4m

Section C: Free Response Questions [30marks]

10	a	i	It could be a plant cell because it has a chloroplast OR it has a large, central vacuole rather than numerous small ones [1] But it could also be an animal cell as it has no cell wall [1]	2
		ii	important chemical reactions take place in x	1
		iii	it does not have a nucleus, which is involved in cell division.	1
	b	i	Circulatory system is made up of the heart, arteries and veins	1
		ii	The heart pumps the blood around the body The blood vessels transport blood to and away from the heart	1 1
		iii	Ensures smooth running and effective working of the different parts in an organisms as well as the organism as a whole	1
	c		It has no nucleus so there is more space for haemoglobin to transport oxygen OR It has a biconcave shape to maximise their surface area for oxygen absorption	2
				Total: 10m
11	a	i		each blank ½ mark ½x8=4
	b		He can add some sea salt into the tank and stir the water until the salt has dissolved. When the density of the salt solution is greater than that of the of the plastic bag filled with water and fish., the bag will float to the surface/	1 1
	c	i	A, C, D and E (any two)	1
		ii	A: large objects such as twigs are suspended in water C: fine impuriries clumping together are suspended in water D: Insoluble particles settle at the bottom of the tank E:Insoluble solid impurities are retained on the filtration bed (any two)	1 1
	c	iii	No It contains dissolved substances such as chlorine, oxygen and fluoride (any one solute)	½ ½
				Total: 10m

12	a	i	sodium and chlorine	1
		ii	Properties of sodium: silver metal, react vigorously with water Properties: Chlorine : yellowish poisonous gas Properties of table salt: white ,edible solid	1 1 1
		iii	The elements that make up a compound are always combined in a fixed proportion by mass/ or A compound cannot be broken down by physical methods.	1
	b	i	Orange colour in drink C Yellow colour in drink F	½ ½
		ii	3	1
		iii	red colour in drink D + green colour in drink A	1
		iv	food dyes are soluble in water or food dyes have distinctive colors, so the movement of dye through the chromatography column is visible or many food dyes are made up of more than one component, so the separation of components is also made clear using chromatography	1
		v	the graphite from a pencil lead/ the pencil line is insoluble in water .so it won't spread and interfere with the result of your chromatogram.	1
				Total: 10m

food dyes have distinctive colors, so the movement of dye through the chromatography column is visible.

Also many food dyes are made up of more than one component, so the separation of components is also made clear using chromatography.

Also the water solubility of most food dyes makes them relatively easy to analyze.
Iggy.