Class	Index Number	Name

HENDERSON SECONDARY SCHOOL

END- OF-YEAR EXAMINATION 2016
SECONDARY 2 EXPRESS

LOWER SECONDARY SCIENCE

MONDAY 10 October 2016

Additional materials:
Multiple Choice Answer Sheet

2 hours

READ THESE INSTRUCTIONS FIRST

Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your Name, Index number and Class on all the work you hand in.
For Booklet A, write in soft pencil.
For Booklet B, write in dark blue or black pen. You may use a soft pencil for any diagrams or graphs.

Booklet A – Section A
There are **thirty** questions in 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 2B pencil** on the separate Multiple Choice 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 12.

Hand in Booklet A, Booklet B and OTAS separately.

Booklet A

This document consists of **12** printed pages.

Setter: Mrs Michelle Do

[Turn over

Downloaded from SingaKids.com

Section A (30 marks)

1 Which one of the following elements has a relative atomic mass of 7?

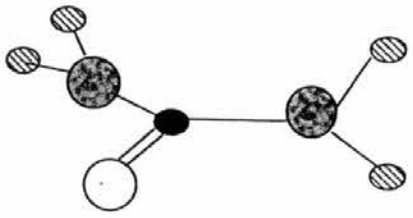
A lithium

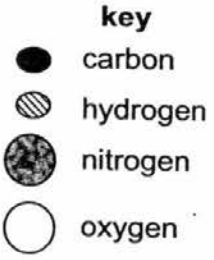
B magnesium

C nitrogen

D oxygen

2 The diagram below shows a molecule.

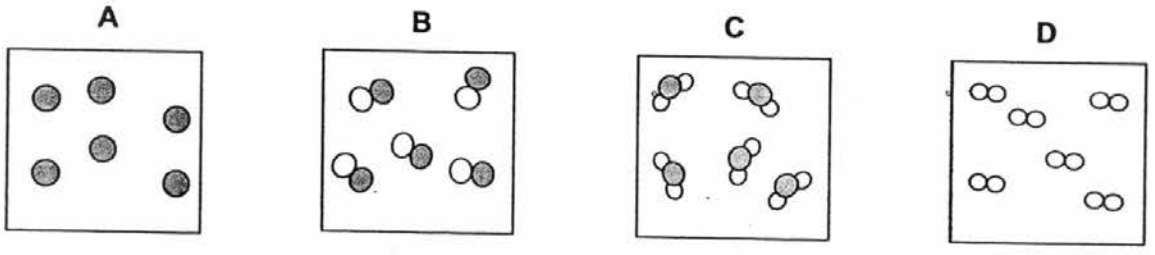




What is the molecular formula of this molecule?

A $(CH_2)_2NO$ B $(CH)_2N_2O$ C $(NH_2)_2CO$ D $(OH_2)_2CN$

3 Which of the following diagrams best represent the particles of the gas argon, **Ar**?



4 Which two atoms have the same number of neutrons?

A $^{11}_{5}B$ and $^{11}_{6}C$

B $^{1}_{1}H$ and $^{4}_{2}He$

C $^{23}_{11}Na$ and $^{24}_{12}Mg$

D $^{16}_{8}O$ and $^{32}_{16}S$

5 Sodium reacts with oxygen to form sodium oxide. Which of the following statements is **true**?

A Sodium oxide can be broken down into simpler substances by electrolysis.

B Sodium oxide has the same properties as sodium and oxygen.

C The substance formed has the same mass as sodium.

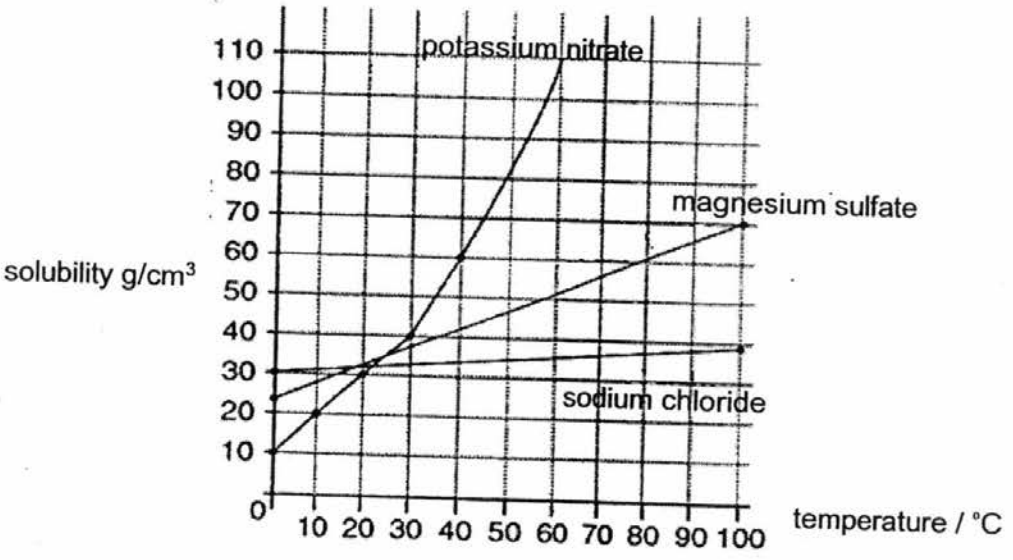
D Two non-metals have combined chemically to form a compound.

Downloaded from SingaKids.com

6 Which of the following differences between a metal and a non-metal is **not** true?

	metal	non-metal
A	high boiling point	low boiling point
B	high density	low density
C	brittle	malleable
D	shiny surface	dull surface

7 The graph below shows how temperature can affect the solubilities of three different salts.



Which of the following statements is/are **true** regarding the solubilities of the salts?

I Potassium nitrate has a higher solubility than magnesium sulfate at 50°C.
II Potassium nitrate has the lowest solubility at 0°C.
III Sodium chloride's solubility increases very slightly with an increase in temperature.

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

8 Both solutions **F** and **G** are of the same volume and consist of the same type of solute and solvent. Solution **F** contains the maximum amount of solute. Solution **G** contains a small amount of solute.

Which of the following statements about the solutions **F** and **G** is **false**?

A Solution **F** has more solute than solution **G**.

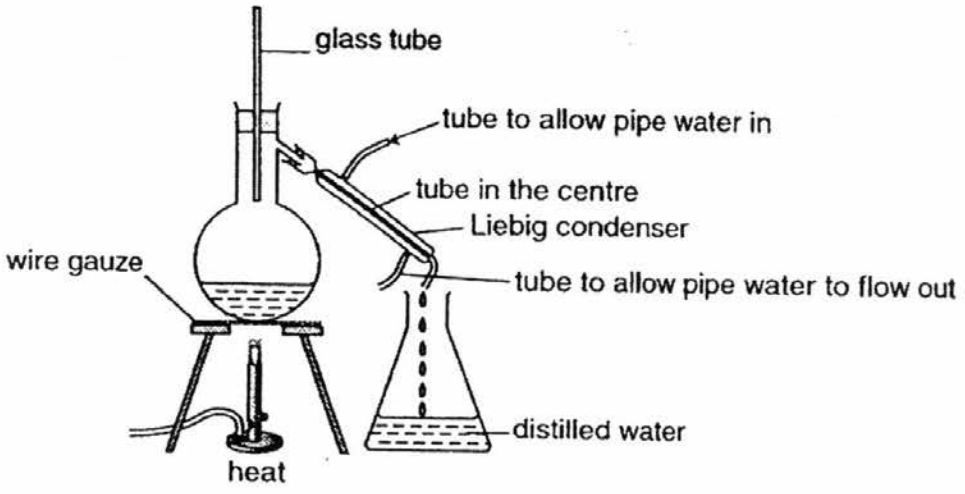
B Solution **F** is a saturated solution.

C Solution **G** can dissolve more solute.

D Solution **G** is less dilute than solution **F**.

SA2 Henderson Secondary School 297
Downloaded from SingaKids.com

9 The diagram shows the apparatus used for distillation.



Which of the following is/are wrongly arranged?

I flow of water in and out of the condenser
II glass tube
III wire gauze

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

10 Which of the following processes is/are involved in distillation?

A boiling only

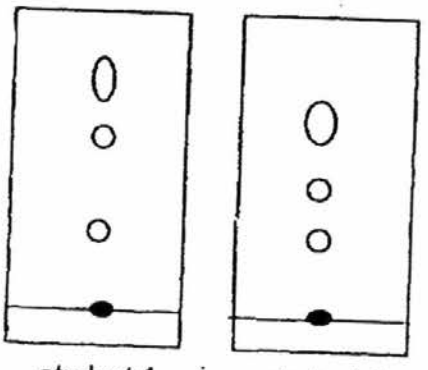
B boiling and condensation

C condensation only

D evaporation only

Downloaded from SingaKids.com

11 Two students were investigating the components of the same food colouring using paper chromatography. The chromatograms obtained are shown below.



Why are the two chromatograms different?

A Student **1** used more of the food dye for the chromatography.

B Student **1** placed insufficient solvent in the set-up.

C Student **2** exposed the chromatography set-up to the air.

D Student **2** used a different solvent which had a different dye solubility.

12 When you mix two different substances,

A a new substance is always formed.

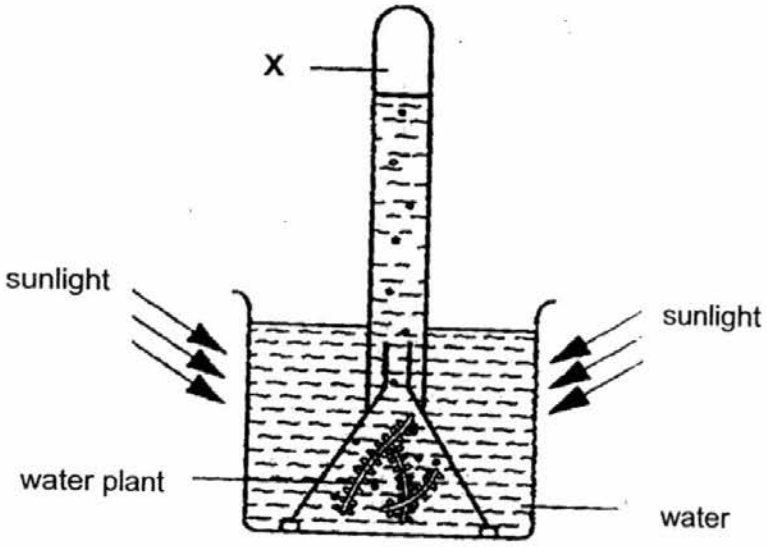
B new substances may or may not be formed.

C no new substance is formed.

D two or more new substances are always formed.

SA2 Henderson Secondary School 299
Downloaded from SingaKids.com

13 The diagram shows apparatus that has been in sunlight for several hours.



Compared with atmospheric air, the gas collected at **X** has

A the same composition.

B more carbon dioxide.

C more oxygen.

D more nitrogen.

14 Which of the following pollutants can dissolve in rain water to form acid rain?

I carbon monoxide
II oxides of nitrogen
III smoke particles
IV sulfur dioxide

A **I** and **III** only **B** **I** and **IV** only **C** **II** and **IV** only **D** **II**, **III** and **IV** only

15 Which of the following is a luminous object?

A aluminium tin

B glass

C the moon

D the sun

Downloaded from SingaKids.com

16 What type of mirror is used as security mirrors in shops?

A concave mirror

B convex mirror

C curved mirror

D plane mirror

17 Which of the following will affect the refractive index of a simple glass block?

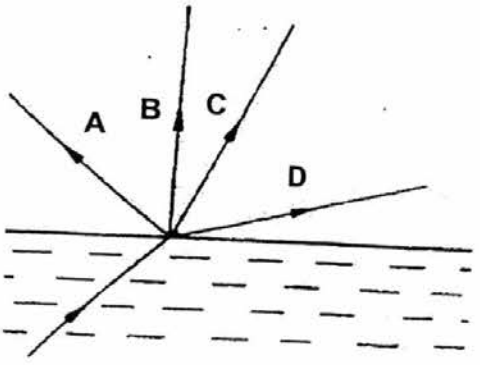
A angle of incidence

B density of glass

C shape of the glass

D thickness of the glass

18 Which letter shows the correct path of a light ray passing from an optically denser object into an optically less dense object?

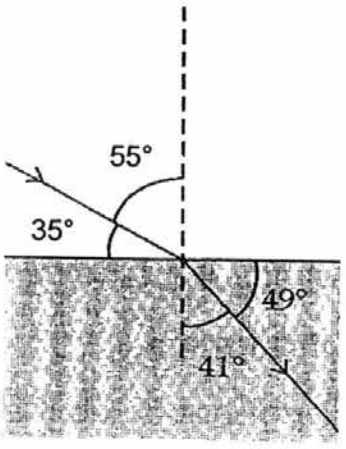


19 A fish in a pond appears to be 1.6 m from the surface of a pond. Given that the refractive index of water is 1.33, what is the real depth of the fish?

A 0.84 m B 1.20 m C 2.13 m D 2.93 m

SA2 Henderson Secondary School 301
Downloaded from SingaKids.com

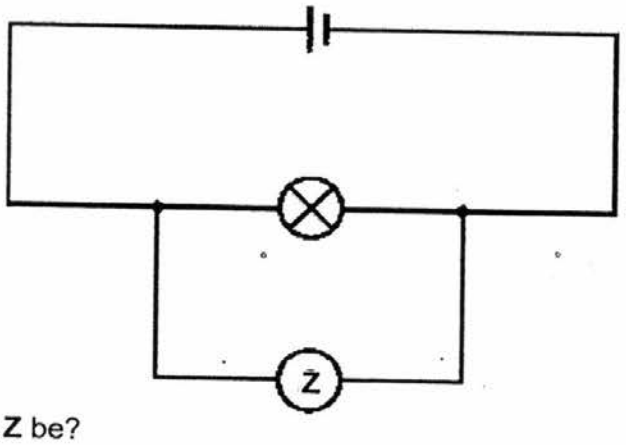
20 The diagram below shows an incident ray from air and striking a transparent solid.



What is the refractive index of the solid?

A 0.76 **B** 0.87 **C** 1.09 **D** 1.25

21 A student sets up a circuit to measure the potential difference across a light bulb as shown below.



What should component **Z** be?

A ammeter

B potentiometer

C resistor

D voltmeter

22 An electric torch's light became dimmer and eventually stopped giving out light. Which of the following is a valid hypothesis based on this observation?

A The batteries need to be replaced.

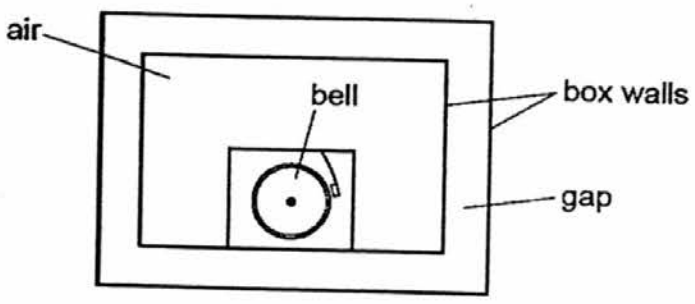
B The bulb is the wrong type.

C The switch of the torch has to be replaced.

D The torch is old.

Downloaded from SingaKids.com

23 The diagram below shows an electric bell enclosed in a box. Various materials were placed in the gap and the loudness of the sound heard from the outside was compared.



Which of the following materials in the gap will result in the loudest sound?

A air

B foam

C vacuum

D wood

24 A girl saw a flash of lightning. She heard a loud sound of thunder after 5 seconds. How far is the lightning from her location? Assume the speed of sound to be 330 m/s and assume the time taken for light to travel is negligible.

A 66 m **B** 330 m **C** 1500 m **D** 1650 m

25 In a guitar, plucking harder will give a ..... sound while plucking a shorter string will give a ..... sound.

A higher ; louder

B louder ; higher

C lower ; softer

D softer ; lower

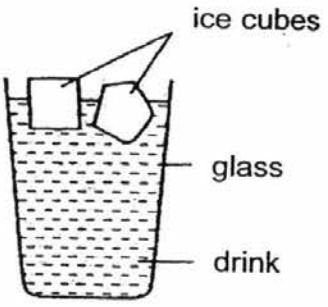
26 Astronauts in space communicate via radio. Which of the following statements are reasons for this?

I The radio transmits sound in the form of waves.
II Their voices cannot be heard outside their soundproof suits.
III They cannot see each other in space.

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

SA2 Henderson Secondary School 303
Downloaded from SingaKids.com

27 Amber puts some ice cubes in a glass of drink to lower the temperature of a drink.



What is the main process by which the liquid at the bottom of the glass cools?

A conduction

B convection

C diffusion

D sinking

28 In cold countries, glass windows consist of two pieces of glass separated by a thin layer of air. The layer of air helps reduce heat loss from the inside of the buildings to the surroundings by

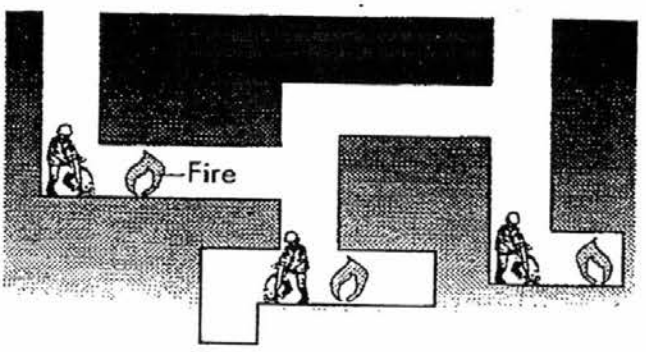
A absorbence.

B conduction.

C convection.

D radiation.

29 The diagram shows some workers working underground. They light a fire in the tunnels.



Which of the following is the correct reason for doing this?

A The heat from the fire keeps the workers warm.

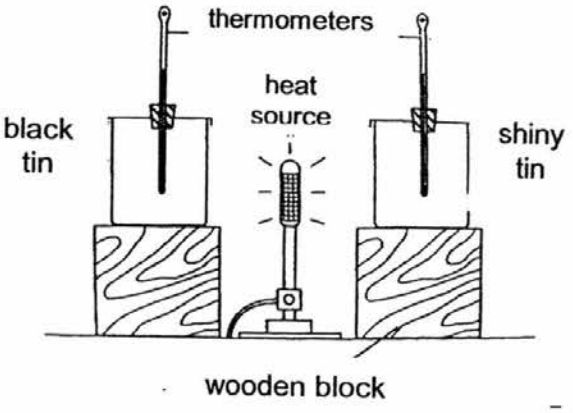
B The heat is needed to set up a convection current so that the air is circulated.

C The light from the fire is necessary to see clearly in the dark.

D The smoke produced by the fire is used for signalling to people above ground.

Downloaded from SingaKids.com

30 A set up of two tins are shown below.



After 20 minutes, it is observed that the thermometer in the black tin shows a faster and higher rise in temperature. This shows that, compared to shiny surfaces, black surfaces are

A better absorbers of heat.

B better radiators of heat.

C poorer absorbers of heat.

D poorer radiators of heat.

- End of Booklet A -

Downloaded from SingaKids.com

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 / b
a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

12

Downloaded from SingaKids.com

b

Class	Index Number	Name

HENDERSON SECONDARY SCHOOL



END-OF-YEAR EXAMINATION 2016
SECONDARY 2 EXPRESS

LOWER SECONDARY SCIENCE

MONDAY 10 October 2016
2 hours

READ THESE INSTRUCTIONS FIRST

Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your Name, Index number and Class on all the work you hand in.
For Booklet A, write in soft pencil.
For Booklet B, write in dark blue or black pen. You may use a soft pencil for any diagrams or graphs.

Booklet B – Sections B and C
Answer **all** questions in Section B and Section C.
Write your answers in the spaces provided on the question paper.
In calculations, you should show all the steps in your working, giving your answer at each stage.

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

Section	Mark
A	/30
B	/40
C	/30
Total:	/100

Booklet B

Hand in Booklet A, Booklet B and OTAS separately.

This document consists of **15** printed pages.

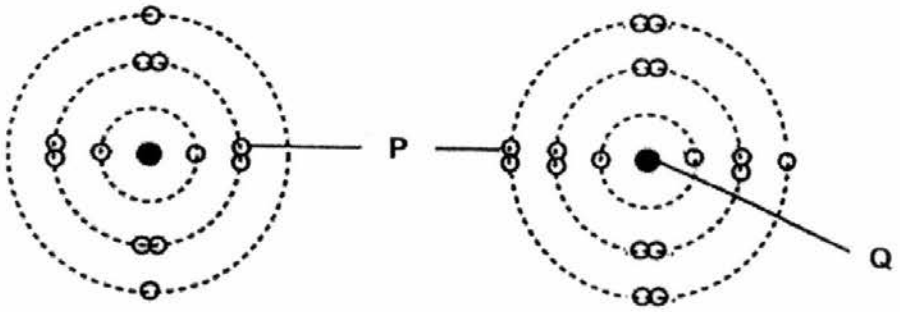
Setter: Mrs Michelle Do

[Turn over

Downloaded from SingaKids.com

Section B (40 marks)

1 **(a)** The diagrams below show the electronic structure of two different atoms of elements **A** and **B**.



element **A** element **B**

(i) Identify **P** and **Q**.

.....[1]

(ii) Using the Periodic Table, identify element **A** and element **B**.

.....[1]

(b) Another element, **X**, exists in two forms, as shown below.

$^{79}_{35}X$ $^{81}_{35}X$

X-79 atom **X-81 atom**

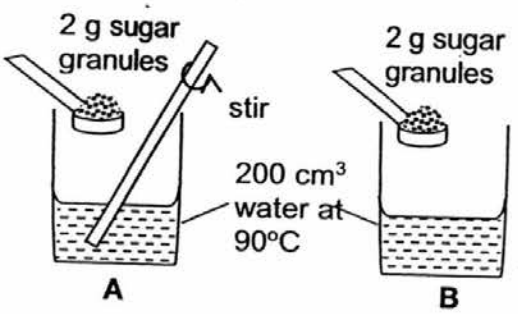
Explain the relationship between these two atoms.

.....

.....[2]

Downloaded from SingaKids.com

2 Study the two experimental set-ups, **A** and **B**, shown below.



(a) Which set up allows sugar to dissolve faster?

.....[1]

(b) Assuming that only 1 g of sugar dissolves in set-up **A**, what is the solubility of sugar at 90°C?

.....[1]

3 The following shows information about an experimental set up investigating the time taken to dissolve substance **P**.

cup	substance **P**	temperature of water/°C
I	50 g of **P** in cube form	40
II	50 g of **P** in cube form	80

(a) Compare cups **I** and **II**, identify the dependent variable and independent variable. [1]

Dependent variable: .....

Independent variable: .....

(b) **(i)** What is the difference between a saturated solution and an unsaturated solution?

..... [1]

(ii) How can you dissolve more **P** in the same volume of solvent without heating the mixture?

.....[1]

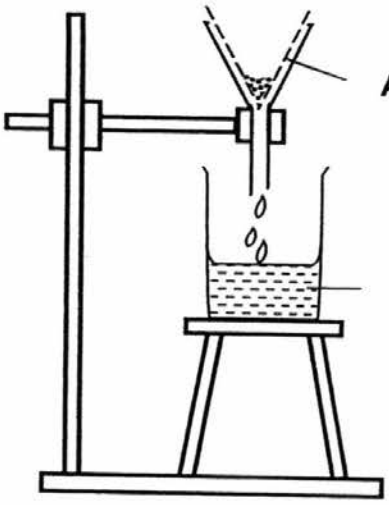
(c) State **two** observations that you could make to determine that a mixture of solid **P** and an excess of water is a solution.

.....

.....[2]

SA2 Henderson Secondary School 309
Downloaded from SingaKids.com

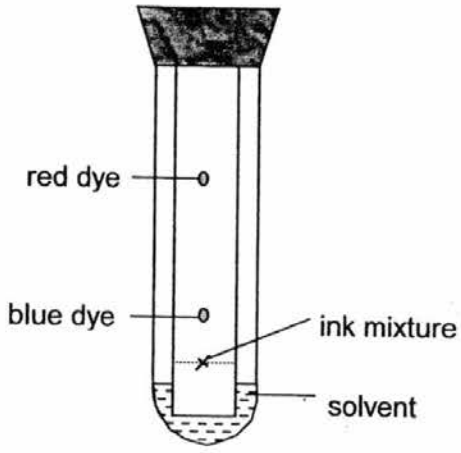
4 **(a)** The diagram below shows a set-up to separate a mixture.
Label the different parts of the set-up shown. [1]



A: .....

B: .....

(b) The diagram below shows another separation process.



State and explain which dye is more soluble in the solvent.

.....

.....[2]

Downloaded from SingaKids.com

(c) A student wanted to separate a mixture of solids **Y** and **Z**. The following table shows the solubilities of **Y** and **Z** in different solvents.

solvent	Y	Z
alcohol	soluble	insoluble
water	insoluble	insoluble

Using the information given above, describe how the student could obtain solids **Y** and **Z** separately from the mixture.

.....

.....

.....

.....

.....

.....

.....[4]

5 (a) A student wants to investigate the chemical properties of a solution. The student decided to use different natural food extracts as indicators to test if a solution is acidic, alkaline or neutral. The colours of three food extracts, **P**, **Q**, and **R**, are shown in the table below.

food extract	colour of in neutral solution	colour in acid	colour in alkali
P	orange	purple	red
Q	green	pink	blue
R	green	green	green

State which food extract(s) is/are suitable be used as an indicator. Explain why.

.....

.....

.....[2]

(b) Explain whether a datalogger or Universal Indicator is more useful at determining pH.

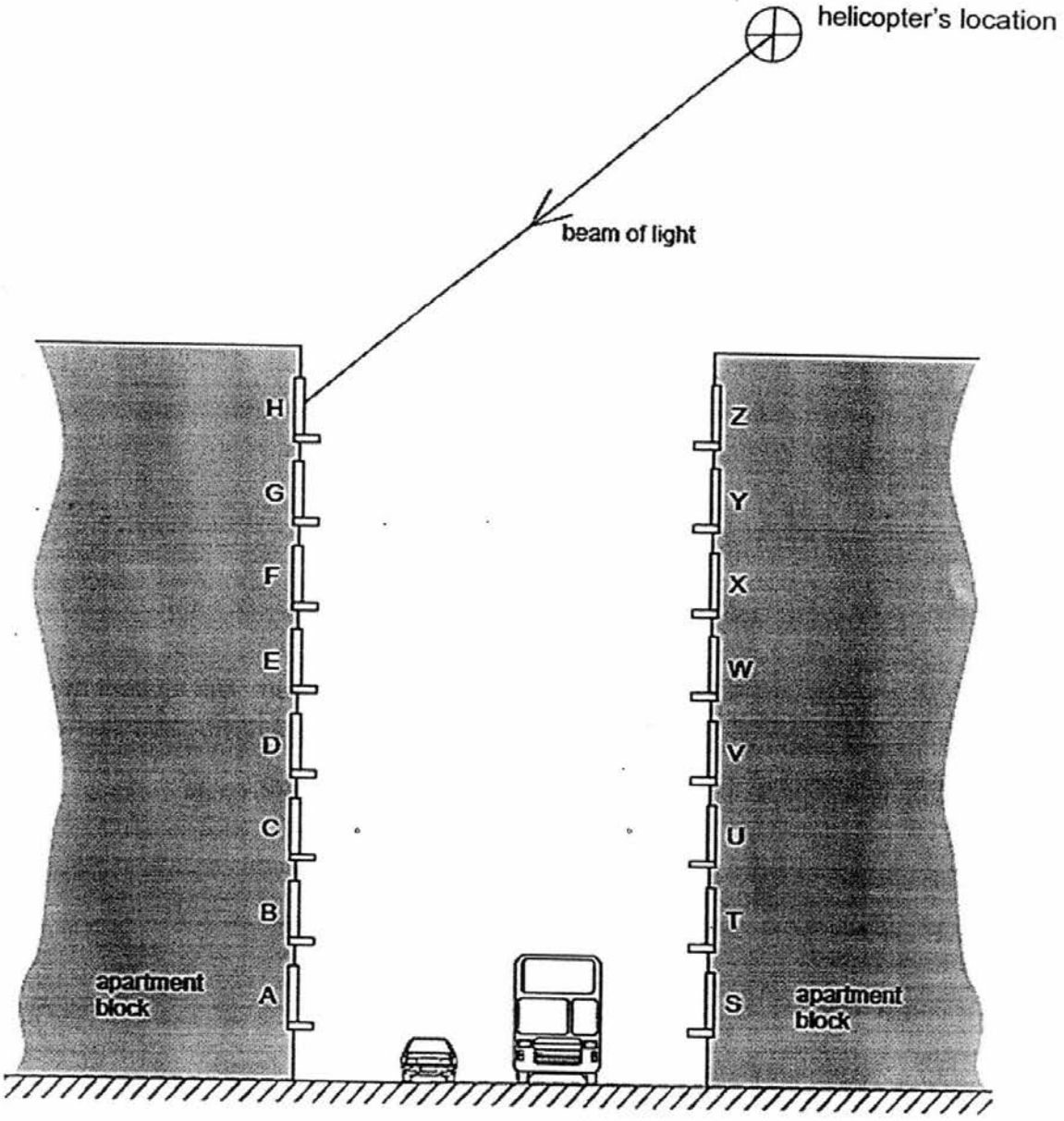
.....

.....

.....[2]

SA2 Henderson Secondary School 311
Downloaded from SingaKids.com

6 The diagram shows two blocks of apartments on each side of a road. A beam of light from a helicopter is hitting the top window **H** of the block of apartment on the left.



(a) Complete the diagram above with the following.

(i) the normal at the point where the beam hits window **H** [1]

(ii) the angle of reflection (r) at the point where the beam hits window **H** [1]

(b) Which window does the beam hit next, after a reflection from window **H**.

.....[1]

(c) Identify windows other than **H**, which may also receive light directly from the helicopter.

.....[1]

Downloaded from SingaKids.com

7 **(a)** A microwave oven has a power rating of 7.5 kW.

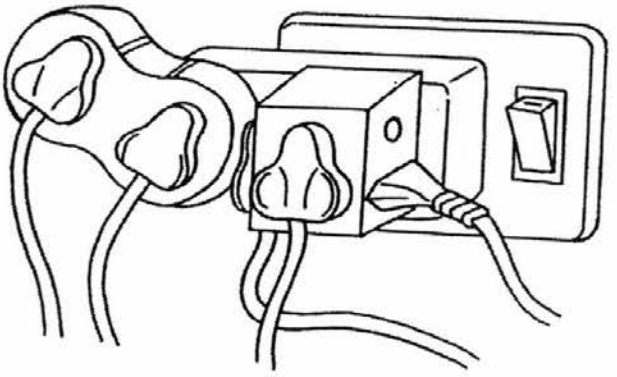
(i) If the oven is used for 2 hours each day, calculate the energy consumption of the oven in kWh in one day.

Energy consumption = ... kWh [1]

(ii) If the cost of energy consumption is $0.25 per kWh, calculate the total cost of using the oven for 2 hours per day over 30 days.

Total cost = $ ..... [2]

(b) Study the picture below that shows an electrical power outlet in a house.



(i) Explain why the house might be in danger.

.....

..... [2]

(ii) Suggest a precaution the people in the house can take to avoid the danger.

.....

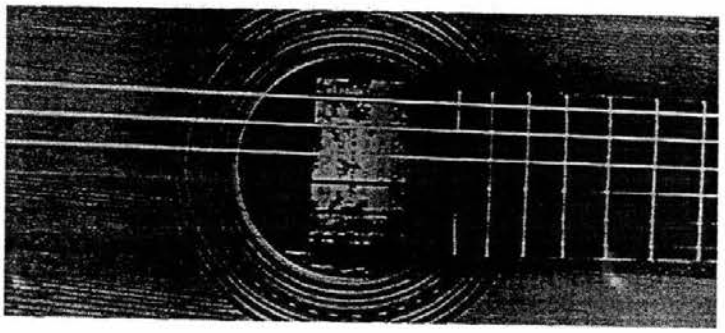
..... [1]

Downloaded from SingaKids.com

8 The diagram shows a guitar and a close-up showing the guitar's strings. Sounds are produced when the strings are plucked.



a guitar



guitar strings

State and explain how the sound will change for each of the following situations.

(a) The string is plucked harder.

.....

.....[2]

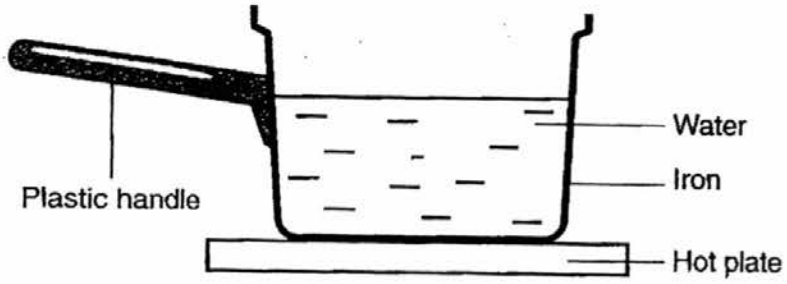
(b) A thinner string is plucked.

.....

.....[2]

Downloaded from SingaKids.com

9 A saucepan with a thick iron base contains water and is placed on a flat electric hot plate.



(a) State the process by which heat energy is

(i) transferred from the hot plate to the water.

.....[1]

(ii) spread throughout the water.

.....[1]

(b) State **one** reason why the water reaches boiling point more rapidly with a lid on the pan.

.....

.....[1]

(c) The sides of saucepans are often polished. Explain how this reduces heat loss.

.....

.....[1]

- End of Section B -

SA2 Henderson Secondary School 315
Downloaded from SingaKids.com

Section C (30 marks)

10 **(a)** Classify the following as *chemical* or *physical* changes.

(i) expansion of a metal ball .....

(iii) mixing citric acid with baking soda .....

(ii) extracting aluminium from aluminium oxide .....

(iv) using electricity to cover a key with a thin layer of chromium .....

[2]

(b) State the type of chemical reactions for the following.

(i) burning of paper .....

(ii) exposing iron to air and water .....

(iii) heating copper carbonate strongly .....

(iv) reacting hydrogen with oxygen to form water .....

[2]

(c) State **two** differences between thermal decomposition and combination.

.....

.....

.....[2]

(d) Complete the following word equations.

(i) ammonia solution + sulfuric acid → ..... + water

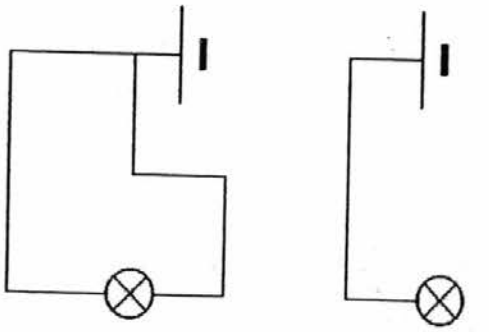
(ii) zinc + hydrochloric acid → zinc chloride + ...

(iii) ..... + ... → potassium nitrate + carbon dioxide + water

[4]

SA2 Henderson Secondary School 316
Downloaded from SingaKids.com

11 **(a)** A student made two unsuccessful attempts to light up a light bulb as shown below.



attempt **1** attempt **2**

(i) Give **one** reason why the light bulb did not light up in attempt **1** or attempt **2**.

.....

.....

[1]

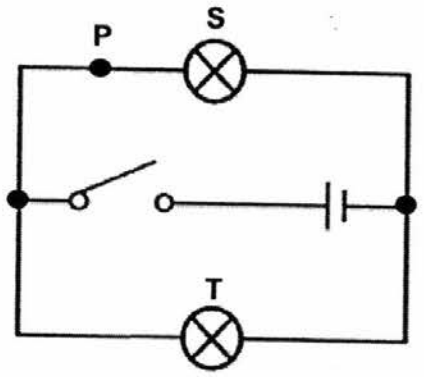
(ii) In the space below, draw a circuit diagram to show how you would connect the light bulb to the electric cell so that the light bulb will light up.

[1]

SA2 Henderson Secondary School

Downloaded from SingaKids.com

(b) The diagram below shows a diagram of a circuit set up by a student.



(i) Another bulb was connected at point **P**. How would this affect the brightness of bulb **S**? Explain your answer.

.....

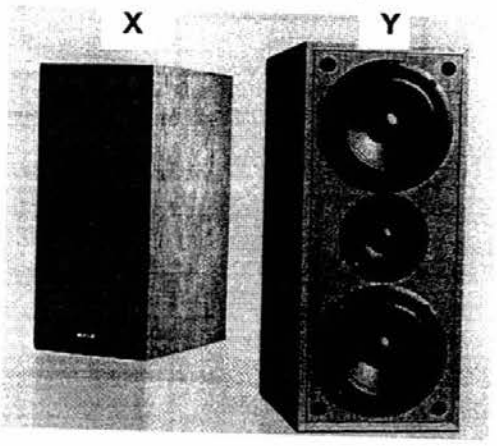
.....

..... [2]

(ii) In the circuit diagram above, draw an ammeter at a position where the overall current of the circuit can be measured. [1]

Downloaded from SingaKids.com

(c) The figure below shows two speaker units, **X** and **Y**, on sale at an electronics store. The salesperson claims that the sound quality of the two speakers are comparable but speaker **X** has a higher price because it is energy-saving.



The table below gives the power and prices of both speakers.

speaker	**X**	**Y**
energy rating (kW)	2.2	3.6
energy use per hour (kWh)	2.2	3.6
price ($)	700	560

Using the information provided in the table, a person needs to decide which speaker has more value for money.

(i) If the speaker will be used for 1 hour daily, calculate the costs per month of using each speaker. Assume that a month has 30 days and that the cost of electricity is $0.25 per kWh.

Cost of using speaker **X** per month = $ .....

Cost of using speaker **Y** per month = $ ..... [2]

(ii) What is the monthly cost savings of using speaker **X**?

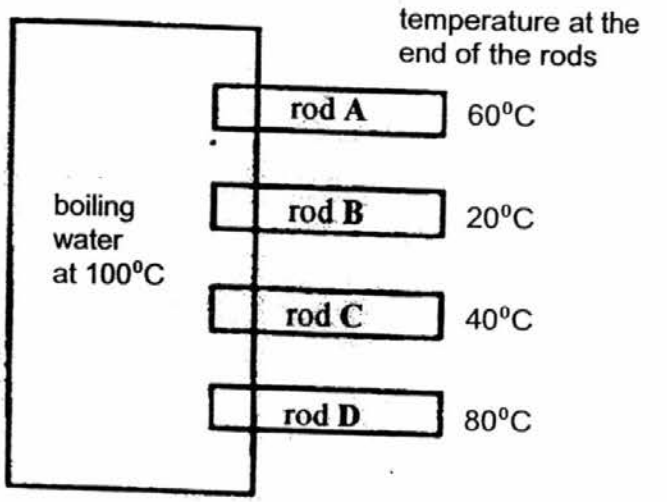
..... [1]

(iii) Speaker **X** costs $140 more than speaker **Y**. If a person purchases speaker **X**, it will take a few months before this $140 is regained through the monthly cost savings in **(ii)**. Calculate the number of months that a person needs to use the speaker to regain the $140. Round up your answer to the nearest month.

Number of months = ... [2]

SA2 Henderson Secondary School 319
Downloaded from SingaKids.com

12 (a) A student placed one end of four different rods **A** to **D** of the same size in a beaker of boiling water. The temperature of the ends of the rods are measured after 5 minutes.



(i) Rank the rods from the best to the poorest conductor of heat. Explain your answer.

.....

.....

..... [2]

(ii) The student took rods **A** and **D** out of the water and heated one end of each rod over a flame. After 10 minutes of heating, the students observed that the heated rod **A** turned red-hot but not rod **D**. Explain this observation.

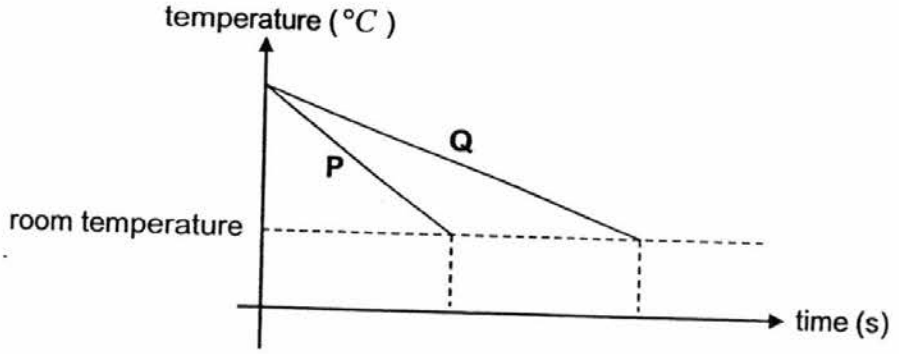
.....

.....

..... [2]

SA2 Henderson Secondary School 320
Downloaded from SingaKids.com

(b) Two identical cups with the same volume of boiling water under the same surrounding conditions are left to cool to room temperature. One can is painted silver and the other painted black. Two graphs **P** and **Q** are plotted in accordance to the results of this experiment. Each graph represents a can that cools to room temperature at a specific time.



(i) Describe the heat transfer processes in this experiment

.....

.....

.....

..... [3]

(ii) Which graph represents the black cup and the silver cup? Explain.

.....

.....

.....

..... [3]

– End of Booklet B –

SA2 Henderson Secondary School 321
Downloaded from SingaKids.com

HENDERSON SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2016

2E SCIENCE Marking Scheme

Section A (30 marks)

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

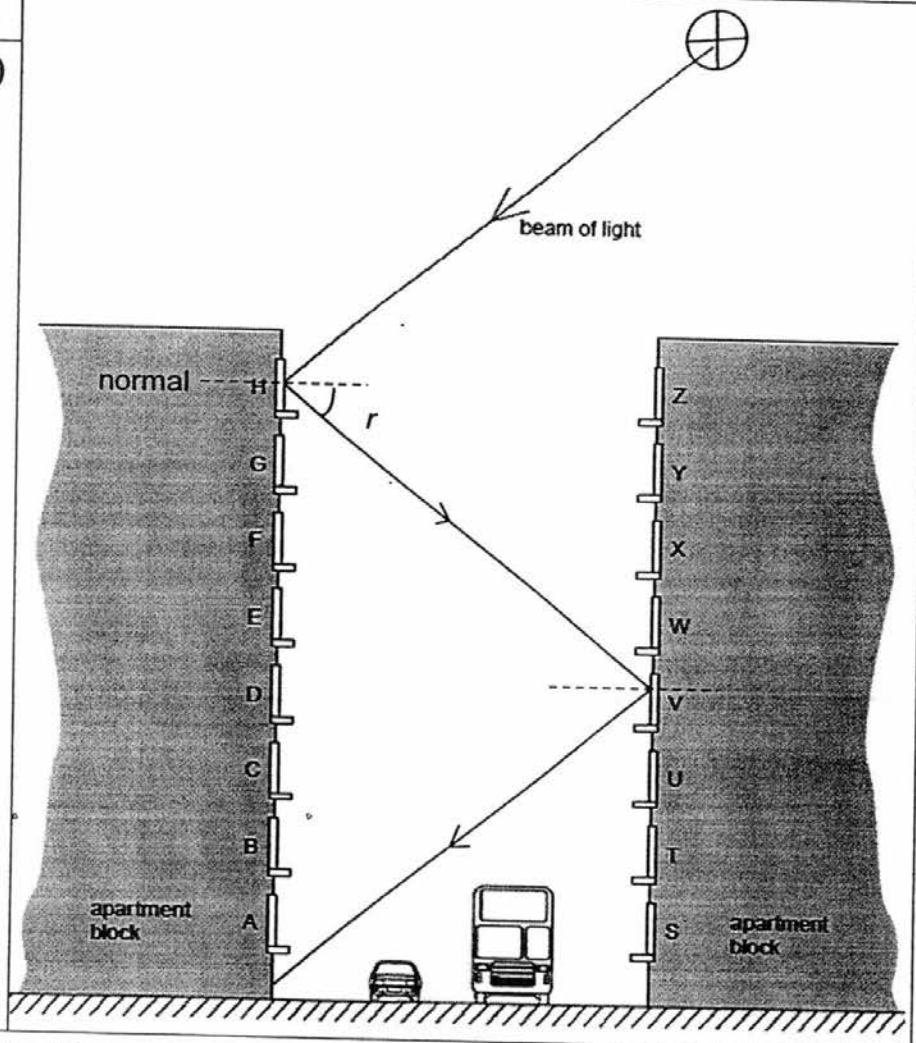
11	12	13	14	15	16	17	18	19	20
D	B	C	C	D	B	B	D	C	D

21	22	23	24	25	26	27	28	29	30
D	A	D	D	B	A	B	B	B	A

Section B (40 marks)

Qn			Answers	Remarks
1	(a)	(i)	**P** – electron, **Q** - nucleus	[1]
		(i)	**A** – magnesium, **B** - chlorine	[1]
	(b)		They are isotopes [1] Because both have 35 protons but X-81 has two extra neutrons. [1] (Same number of protons but different number of neutrons/ atomic mass/ nucleon number.)	[2] must refer to data
2	(a)		**A**	[1]
	(b)		0.5 g sugar per 100cm^3 of water	[1] (or 1g/200cm^3)
3	(a)		Dependent variable – time taken to dissolve Independent variable – temperature of water	[1]
	(b)	(i)	A saturated solution has the maximum amount of solute/dissolved solids whereas more solute/solids can still dissolve in an unsaturated solution.	[1]
		(ii)	Change the solvent (to one where the **P** has a higher solubility).	[1]
	(c)		A solution is clear/lets light through but a suspension is opaque/does not let light through. [1] When left to sit, a suspension will have particles that settle to the bottom, but a solution will not. [1] When filtered, a suspension will leave a residue, but a solution will not. [1]	[2] for any 2
4	(a)		**A** – filter paper, **B** - filtrate	[1] for both
	(b)		The red dye is more soluble in the solvent [1] because it travels a further distance on the chromatogram than the blue dye. [1]	[2]
	(c)		Add alcohol and stir to dissolve **Y**. [1] Filter resultant mixture. [1] **Z** is the residue. [1] Evaporate alcohol from filtrate to get **Y**. [1]	[4]
5	(a)		Extracts **P** and **Q** can be used as indicators [1] because they show different colours in acidic/alkaline/neutral (at least 2) solutions(OR at different pHs). [1]	[2]

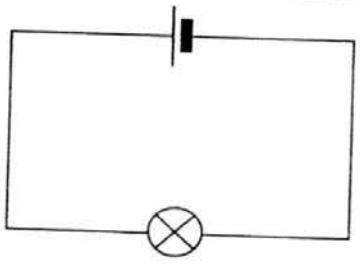
Downloaded from SingaKids.com

	(b)	A datalogger is more useful [1] Because it can be used to <u>differentiate pH more finely</u> compared to Universal Indicator [1] OR <u>to one decimal place</u> whereas Universal Indicator can only differentiate pH <u>to whole numbers</u>. [1]		[2]
6	(a)	(i)		[1] for normal
		(ii)		[1] for reflected ray and angle *r*
	(b)	window V		[1]
	(c)	All windows from A to G.		[1]
7	(a)	(i)	Energy use in 1 day = 7.5 kW x 2 h = **<u>15 kWh</u>**	[1]
		(ii)	Energy use in 30 days [1] = 15 kW x 30 days = <u>450 kWh</u> Cost [1] = 450 kWh x $ 0.25 per kWh = **<u>$ 112.50</u>**	[2] 1m energy use 1m cost
	(b)	(i)	Too <u>many appliances using one outlet</u>. [1] High current drawn can cause an <u>electrical fire</u>. [1]	[2]
		(ii)	<u>One appliance to one outlet</u>, especially heating appliances.	[1]
8	(a)		<u>Louder sound</u> [1] because a <u>higher amplitude</u> is produced. [1]	[2] No contradictions

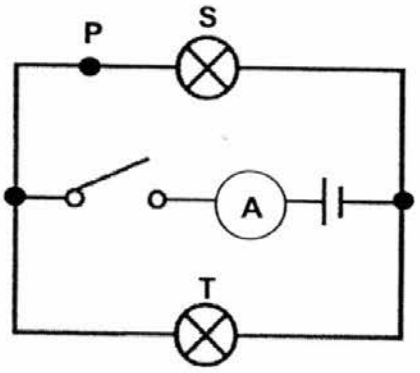
Downloaded from SingaKids.com

	(b)	Higher pitch [1] because a thinner string has a higher frequency [1]		[2] No contradictions
9	(a)	(i)	conduction	[1]
		(ii)	convection	[1]
	(b)	Reduce heat lost via convection.		[1]
	(c)	Shiny surfaces are poor emitters of heat.		[1]

Section C (30 marks)

Qn			Answers	Remarks
10	(a)	(i)	physical	[2] 1m for 2
		(ii)	chemical	
		(iii)	chemical	
		(iv)	chemical	
	(b)	(i)	combustion	[2] 1m for 2
		(ii)	rusting/oxidation	
		(iii)	thermal decomposition	
		(iv)	oxidation/combustion/ combination	
	(c)	Thermal decomposition occurs in the presence of heat but combination does not require heat. [1] Thermal decomposition breaks down one reactant into two or more products, but combination has two or more reactants and results in one or more products. [1]		[2]
	(d)	(i)	ammonia solution + sulfuric acid → ammonium sulfate + water	[1]
		(iii)	zinc + hydrochloric acid → zinc chloride + hydrogen	[1]
		(iv)	potassium carbonate + nitric acid → potassium nitrate + carbon dioxide + water	[2]
11	(a)	(i)	Attempt 1: circuit does not have energy supply/electric cell [1] Attempt 2: circuit is open / Not a complete circuit [1]	either for [1]
		(ii)		[1]
11	(b)	(ii)	The brightness of bulb **S** will decrease. [1] New bulb is connected in series to bulb **S**. [1]	[2]

Downloaded from SingaKids.com

Qn			Answers	Remarks
11	(b)	(ii)		[1] ammeter in series with electric cell on main branch
	(c)	(i)	Cost of speaker X per month = 2.2 kWh x 30 days x \$0.25 per kWh = <u>\$16.50</u> Cost of speaker Y per month = 3.6 kWh x 30 days x \$0.25 per kWh = <u>\$27</u>	[2] 1m working 1m both answers
		(ii)	Electricity cost saved by **X** per month [1] = \$27 – \$16.50 = <u>\$10.50</u>	[1] for working or answer allow e.c.f.
		(iii)	Number of months for **X** to result in cost savings over **Y** [1] = \$140/\$10.50 per month = 13.3 ≈14 months (rounded up)	[2] 1m working 1m answer allow e.c.f.
12	(a)	(i)	Rank: D, A, C, B The best conductor of heat will transfer heat to the opposite end the fastest [1]	[2]
		(ii)	Rod A conducts heat away from the heated end more slowly than rod D.[1] Thus the heated end of rod A does reaches higher temperatures (gets red-hot). [1]	[2]
	(b)	(i)	Heat is transferred by conduction from the water to the cup. [1] and by conduction and radiation from the cup to the air. [2]	[3]
		(ii)	P represents the black cup whereas Q represents the silver cup [1] because silver surfaces cools at a slower rate than black ones. [1] silver surfaces are poor radiators of heat compared to black surfaces.[1]	[3]

- End of Examination Marking Scheme -

Downloaded from SingaKids.com