

Visit
FREETESTPAPER.com
for more papers



Website: freetestpaper.com



[Facebook.com/freetestpaper](https://www.facebook.com/freetestpaper)



[Twitter.com/freetestpaper](https://www.twitter.com/freetestpaper)

Class	Index Number	Name
-------	--------------	------

HENDERSON SECONDARY SCHOOL



MID-YEAR EXAMINATION 2016 SECONDARY 2 EXPRESS

LOWER SECONDARY SCIENCE

WEDNESDAY 18TH MAY

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.

Hand in Booklet A, Booklet B, and MCAS separately.

Booklet A

Setter: Ms K Chandran

This document consists of **10** printed pages.

[Turn over]

Section A (30 marks)

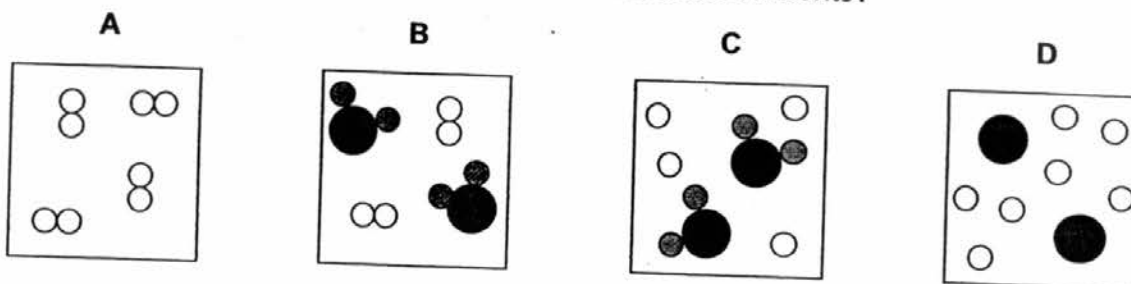
- 1 The chemical name for table salt is sodium chloride.
It is made up of elements sodium and chlorine.
Which of the following statements is **not** correct?
- A Both elements are able to conduct electricity at room temperature.
 - B It cannot be separated into their elements by physical means.
 - C The elements are joined together in fixed proportions by mass.
 - D The properties of its components differ from that of sodium chloride.
- 2 Which of the following only contains compounds?
- A bronze, gold, iron
 - B chlorine, carbon dioxide, lead
 - C salt, sugar, water
 - D silicon, sulfur, zinc
- 3 Which of the following is a molecule of an element?
- A Co
 - B CO
 - C CO₂
 - D O₂
- 4 The table shows information related to three different substances, **P**, **Q** and **R**. Substances **Q** and **R** have more than two components.

substance	information
P	made up of one type of atoms
Q	components that make up the substance exist in a fixed ratio
R	components that make up the substance can still be seen

Based on the table, which of the following statements is true?

- A A chemical reaction is involved to produce substance **Q** but not substance **R**.
- B If substance **R** is mixed with substance **P** by physical means, the properties of the substances will change.
- C Substance **P** and **Q** cannot be separated into simpler substances.
- D Substance **P** must be a metal.

- 5 Which of the following diagrams represents a mixture of two elements?



- 6 You are given a mixture of ethanol and a dilute solution of sodium chloride in water. Ethanol boils at 78°C and sodium chloride dissolves in water. To obtain ethanol and solid sodium chloride, what two techniques would you use?

	first technique	second technique
A	distillation	evaporation
B	evaporation	distillation
C	filtration	distillation
D	filtration	evaporation

- 7 A very old painting has been sprayed accidentally with new paint. The solubilities of the old paint and the new paint in different solvents are shown below.

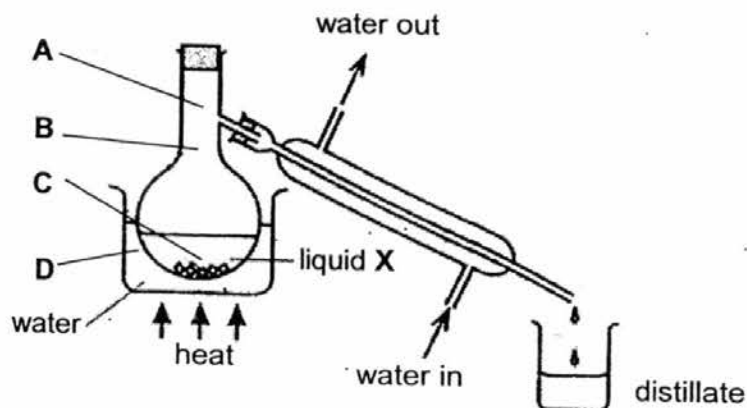
Which solvent could be used to remove the new paint without damaging the original painting?

solvent	old paint	new paint
A	insoluble	insoluble
B	insoluble	soluble
C	soluble	insoluble
D	soluble	soluble

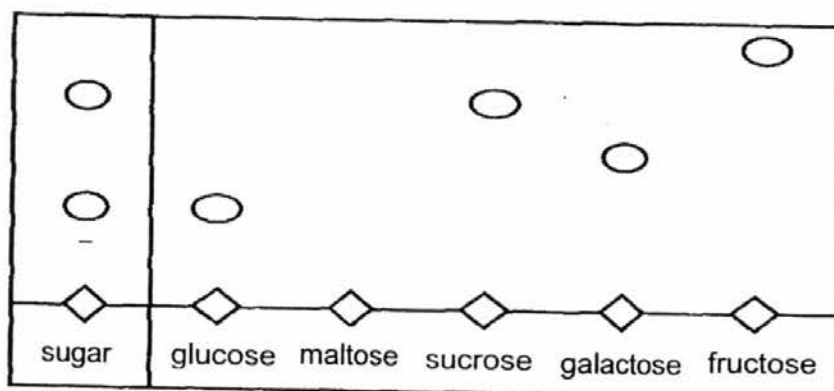
- 8 Some table salt has been mixed with sand. What is the correct order of techniques needed to obtain the pure salt from the mixture?

- A** dissolving $\rightarrow$ evaporating $\rightarrow$ filtering
B dissolving $\rightarrow$ filtering $\rightarrow$ evaporation
C evaporating $\rightarrow$ dissolving $\rightarrow$ filtration
D filtration $\rightarrow$ evaporating $\rightarrow$ dissolving

- 9 Which factor given below does **not** affect the solubility of a substance?
- A rate of stirring
 - B temperature
 - C type of solute
 - D type of solvent
- 10 The set-up shown below is used to measure the boiling point of a liquid X. Where should the bulb of the thermometer be placed?



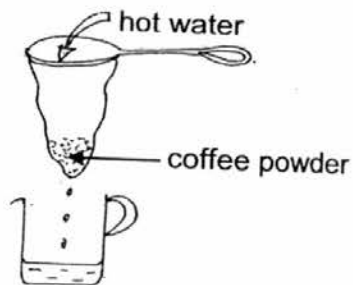
- 11 Sugar was treated with dilute hydrochloric acid. The resulting solution was analysed by chromatography. The following chromatogram was obtained.



This chromatogram suggests that dilute hydrochloric acid breaks down the sugar into

- A fructose, galactose and glucose.
- B fructose, glucose, and sucrose.
- C glucose, maltose and one sugar not among the reference sugars.
- D glucose and sucrose.

- 12 What is used to decompose copper chloride solution into copper and chlorine gas ?
- A electricity
 - B heat
 - C light
 - D oxygen
- 13 Which of the following is a physical change?
- A baking cakes
 - B burning paper
 - C cooking food
 - D dissolving sugar in a cup of tea
- 14 Which separation technique is used to show that sea water contains dissolved substances?
- A condensation
 - B distillation
 - C evaporation
 - D filtration
- 15 The following diagram shows a coffee bag used in a coffee shop to separate the coffee powder from the black coffee after pouring hot water into the coffee bag.



The coffee powder that is left behind in the coffee bag is known as the (1) and the black coffee is the (2)

	(1)	(2)
A	filtrate	residue
B	residue	filtrate
C	solute	solvent
D	solvent	solute

- 16 Timothy heated four different substances. Based on his observations, which one of them underwent a physical change upon heating?

	appearance at the start	observation made during heating	appearance after cooling
A	clear liquid	clear liquid	clear liquid
B	green powder	black solid	black solid
C	purple crystals	purple vapour	purple solid on sides of test tube
D	white solid	white solid	white solid

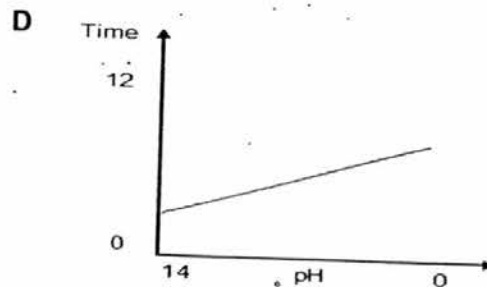
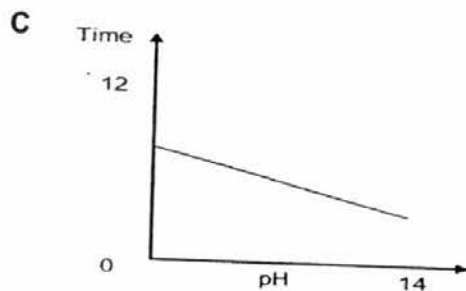
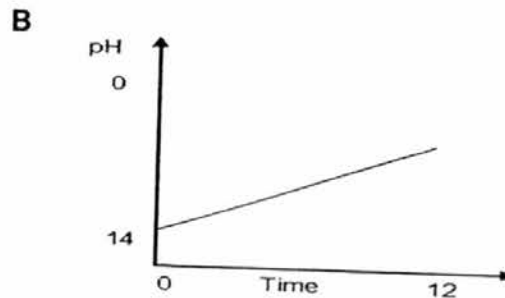
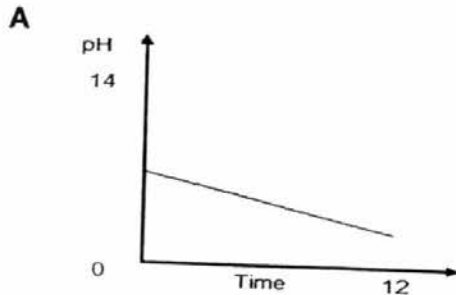
- 17 During respiration, glucose reacts with oxygen to form carbon dioxide and water.

Which of the following word equations correctly represents this change?

- A carbon dioxide + glucose $\longrightarrow$ oxygen + water
- B carbon dioxide + water $\longrightarrow$ glucose + oxygen
- C glucose + oxygen $\longrightarrow$ carbon dioxide + water
- D glucose + water $\longrightarrow$ carbon dioxide + oxygen
- 18 Jerry is stung by a bee. His mother rubs baking soda on his wound to relieve the pain. What can you infer from this observation?
- A The bee sting contains an element which reacts with the baking soda.
- B The bee sting is acidic.
- C The bee sting is alkaline.
- D The bee sting is neutral.
- 19 Calcium hydroxide reacts with sulfuric acid to form a salt and water. Which of the following is the **correct** name of the salt formed?
- A calcium hydrate
- B calcium oxide
- C calcium sulfate
- D calcium sulfuric
- 20 Which of the following solutions when mixed may form a solution of pH 7?
- A ammonia solution and water
- B hydrochloric acid and potassium hydroxide
- C sodium chloride solution and nitric acid
- D sodium hydroxide and water

- 21 Jackson wanted to do a simple experiment. He bought a carton of orange juice and a carton of yoghurt from the supermarket. He mixed them together in equal proportions and tested the pH level of the mixture at 2-hour intervals. The table below shows the results obtained. Choose the correct graph that the student had plotted based on his experimental results.

time (hour)	0	2	4	6	8	10	12
pH	5	4.5	4	3.5	3	2.5	2



- 22 Jack was told to heat four substances. Which substance will undergo a chemical change upon heating?

A	iodine
B	salt
C	sugar
D	wax

- 23 Which of the following changes are caused by exposure to light?

- I burning of charcoal
- II decomposition of silver bromide on film
- III manufacturing food by green plants
- IV production of vitamin D in skin

A I, II

B I, III

C II, III

D II, III, IV

The table gives information about three indicators.

Use the following table to answer questions 24 and 25

indicator	colour at pH 2	pH at which color changes	colour at pH 13
phenolphthalein	colourless	8	red
thymol blue	blue	4	pink
congo green	orange	12	green

- 24 Which colours would be obtained when each indicator is added to a neutral solution?

	phenolphthalein	thymol blue	congo green
A	colourless	blue	orange
B	colourless	pink	orange
C	red	blue	green
D	red	pink	green

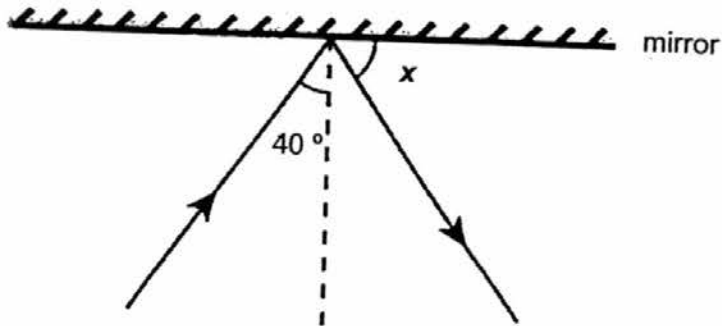
- 25 When the three indicators are added to three test tubes of solution Y, the colours of the indicators are as shown in the table below.

phenolphthalein	thymol blue	congo green
red	pink	orange

Which of the following pH could be the pH of solution Y?

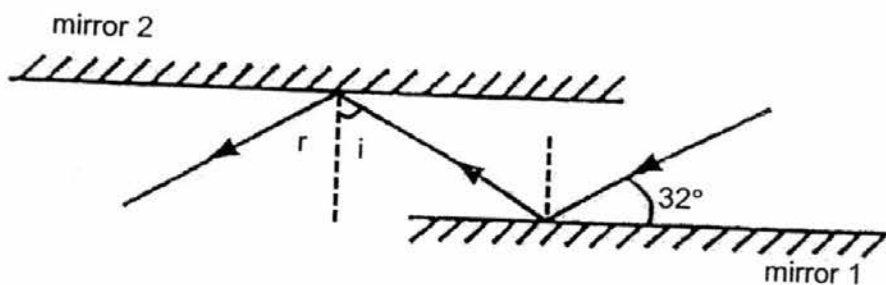
- A pH 2
B pH 3
C pH 9
D pH 14
- 26 A fish in a pond appears to be 1.6 m from the surface of a pond. Given that the refractive index of water is 1.33, what is the real depth of the fish?
- A 0.84 m B 1.20 m C 2.13 m D 2.93 m
- 27 A boy is having his eyesight tested by an optician. The chart is located 5 m behind him. There is a mirror 4 m in front of him. How far does this chart appear from him?
- A 4m
B 9 m
C 10 m
D 13 m

- 28 The diagram below shows a light ray which is incident on a plane mirror.

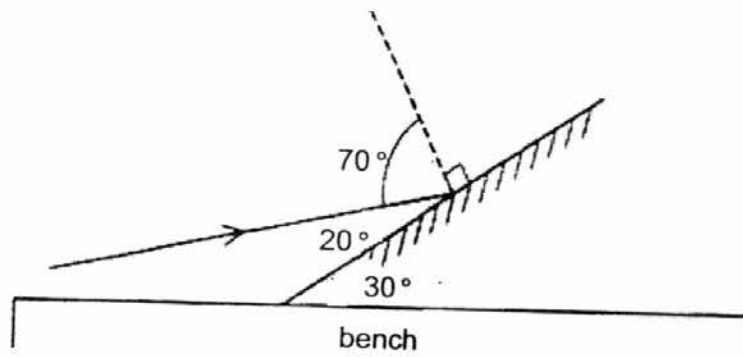


What is the value of x ?

- 29 Given that mirror 1 and 2 are parallel to each other, what will be the **angle of reflection** of the reflected ray at mirror 2, when a single ray of blue light hits the surface of plane mirror 1 at 32° ? (Note: The diagram is **not** drawn to scale.)



- 30 A mirror is placed tilted at an angle of 30° to the bench. A ray of light is directed so that it hits the mirror at an angle of 20° to the surface of the mirror.



What is the angle of reflection of the ray?

- A 20° B 30° C 50° D 70°

- End of Booklet A -

DATA SHEET

The Periodic Table of the Elements

The Periodic Table of the Elements																	
Group																	
I	II											III	IV	V	VI	VII	0
		1 H Hydrogen															
3 7 Li Lithium	4 9 Be Beryllium																
11 23 Na Sodium	12 24 Mg Magnesium																
19 39 K Potassium	20 40 Ca Calcium	21 45 Sc Scandium	22 48 Ti Titanium	23 51 V Vanadium	24 52 Cr Chromium	25 55 Mn Manganese	26 56 Fe Iron	27 59 Co Cobalt	28 58 Ni Nickel	29 64 Cu Copper	30 65 Zn Zinc	31 70 Ga Gallium	32 73 Ge Germanium	33 75 As Arsenic	34 79 Se Selenium	35 80 Br Bromine	36 84 Kr Krypton
37 85 Rb Rubidium	38 88 Sr Strontium	39 89 Y Yttrium	40 91 Zr Zirconium	41 93 Nb Niobium	42 96 Mo Molybdenum	43 101 Tc Technetium	44 101 Ru Ruthenium	45 103 Rh Rhodium	46 106 Pd Palladium	47 108 Ag Silver	48 112 Cd Cadmium	49 115 In Indium	50 119 Sn Tin	51 122 Sb Antimony	52 128 Te Tellurium	53 127 I Iodine	54 131 Xe Xenon
55 133 Cs Caesium	56 137 Ba Barium	57 139 La Lanthanum	72 178 Hf Hafnium	73 181 Ta Tantalum	74 184 W Tungsten	75 186 Re Rhenium	76 190 Os Osmium	77 192 Ir Iridium	78 195 Pt Platinum	79 197 Au Gold	80 201 Hg Mercury	81 204 Tl Thallium	82 207 Pb Lead	83 209 Bi Bismuth	84 210 Po Polonium	85 210 At Astatine	86 210 Rn Radon
87 Fr Francium	88 226 Ra Radium	89 227 Ac Actinium															

*58-71 Lanthanoid series
†90-103 Actinoid series

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

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	241 Pu Plutonium 94	244 Am Americium 95	247 Cm Curium 96	251 Bk Berkelium 97	259 Cf Californium 98	265 Es Einsteinium 99	267 Fm Fermium 100	271 Md Mendelevium 101	285 No Nobelium 102	289 Lr Lawrencium 103

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

Class	Index Number	Name
-------	--------------	------

HENDERSON SECONDARY SCHOOL



MID-YEAR EXAMINATION 2016 SECONDARY 2 EXPRESS

LOWER SECONDARY SCIENCE

WEDNESDAY 18TH MAY

2 hours

Additional materials:
Writing paper (on request)

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 MCAS separately.

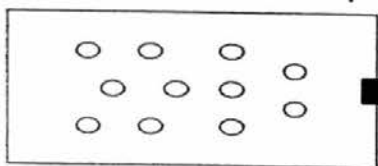
Setter: Ms K Chandran

This document consists of 10 printed pages.

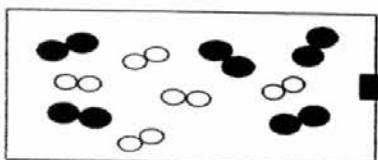
[Turn over]

Section B (40 marks)

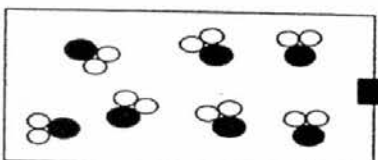
- 1 (a) The diagrams below show the arrangement of particles in some substances. Match each diagram to one of the descriptions on the right. [5]



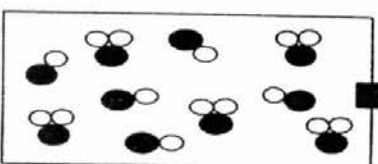
mixture of 2 compounds



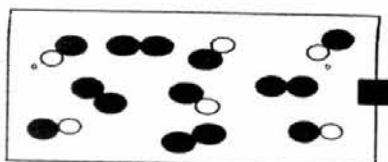
compound



mixture of molecules of
an element and
molecules of a compound



atoms of an element



mixture of 2 elements
made up of diatomic
molecules

- (b) State one similarity and one difference between molecules of an element and molecules of a compound.

.....

.....

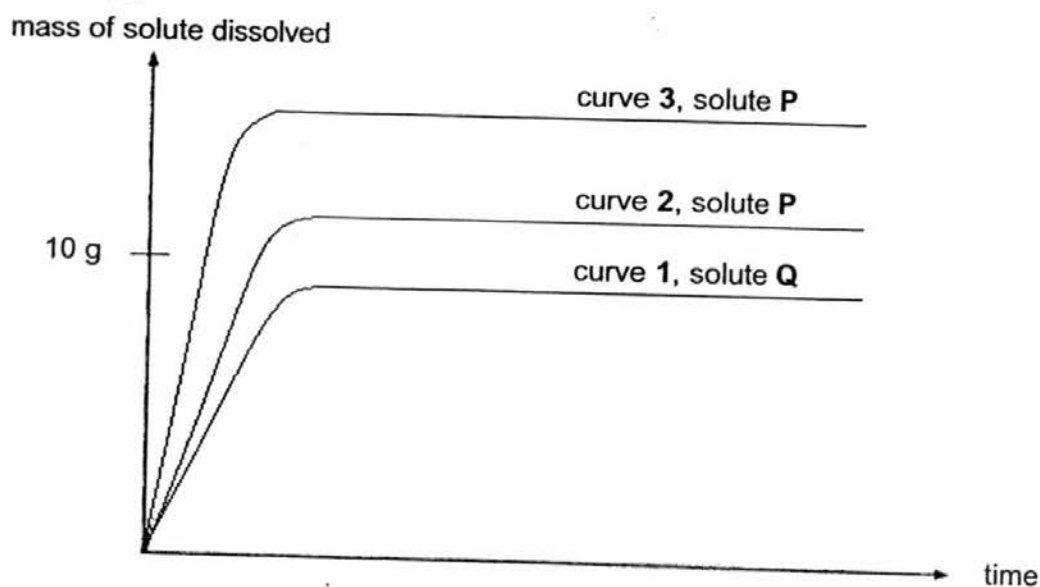
.....

.....[2]

- (c) The table shows some information about atoms of elements W and X. (The letters do not represent the symbols of the elements.) Complete the table by filling in information for these elements. [3]

element	mass number	atomic number	number of electrons	number of neutrons
W	27	13		
X	23		11	12

- 2 Tricia dissolved 18 g of two different solutes, **P** and **Q**, into two beakers each containing 50 cm³ of water at room temperature. The mixture in each beaker was stirred until no more solutes could be dissolved.



- (a) With reference to curves 1 and 2 in the graph above, compare the difference in solutes **P** and **Q** in terms of their solubility in water.

.....
[1]

- (b) What does the horizontal line of each curve represent?

.....
[1]

- (c) Tricia repeated the experiment with the same conditions as above, except using smaller particle size of solute **Q** only.

Draw, on the same axes, the curve that would result.

[1]

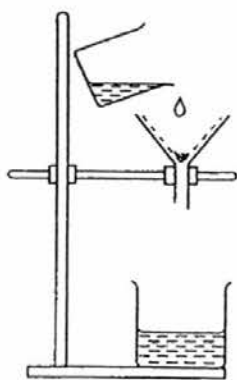
- (d) (i) Suggest how curve 3 for solute **P** can be obtained if 18 g of solute **P** is dissolved in 50 cm³ of water.

.....
[1]

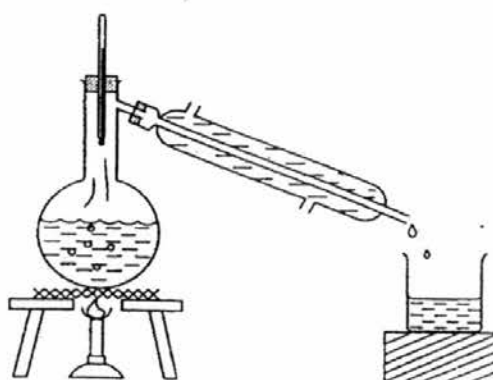
- (ii) Explain your answer in (d)(i).

.....
[2]

- 3 The diagram shows two methods of separating water from the mixtures.



M



N

- (a) Name the two methods, M and N.

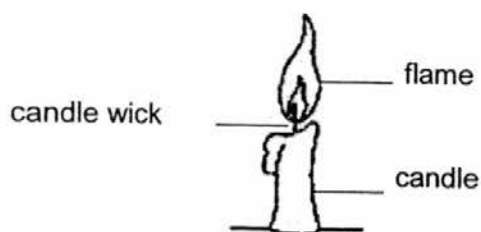
.....
[2]

- (b) Which of the two methods is a better way of purifying water? Why?

.....

[2]

- 4 The diagram below shows a candle burning.



- (a) Identify a physical change in the diagram and explain why it is considered a physical change.

.....

[2]

- (b) Identify a chemical change in the diagram and explain why it is considered a chemical change.

.....
[2]

- (c) (i) State the other reactant that is needed for the reaction to take place.

.....[1]

- (ii) The candle wick is a form of carbon.
 Write down the word equation for the chemical change.

.....[2]

- 5 Study the following activities carefully. State the name of the process and whether it is a chemical change or physical change.

[3]

- (a) (i) Heat magnesium ribbon in a jar of oxygen gas.
 (ii) Heat iron filings and sulfur powder in a test tube.
 (iii) Heat a piece of candle wax in a test tube.

	name of the process	chemical change or physical change
(i)		
(ii)		
(iii)		

- (b) A list of chemicals is given below:

- zinc
- calcium hydroxide
- nitric acid

Select chemicals from the list and write down a word equation that will give each of the following products. Each chemical may be used more than once or not at all.

- (i) salt and water only

.....[2]

- (ii) hydrogen gas

.....[2]

- 6 (a) State the laws of refraction.

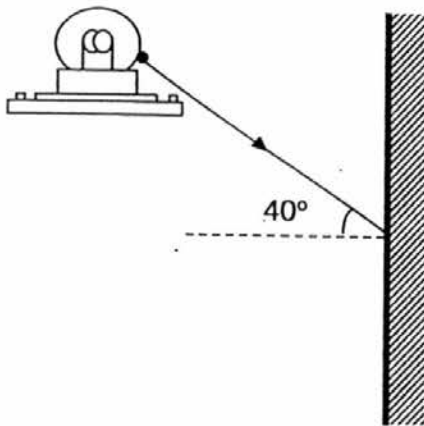
.....

.....

.....

.....[2]

The diagram shows a light ray from a light bulb hitting the surface of a plane mirror. Consider the light ray as coming from the point on the light bulb.



- (b) The light ray bounces off the surface of the plane mirror.
What is the name for this change in direction of the light ray?

.....[1]

- (c) On the diagram,

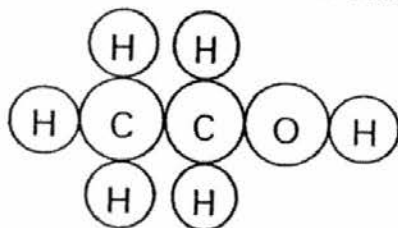
- (i) mark accurately, with a dot and letter **B**, the position of the image of the bulb,
- (ii) show the path of the light ray after it bounces off the surface of the plane mirror, and
- (iii) mark and write the angle of reflection.

[3]

- End of Section B -

Section C (30 marks)

- 7 (a) Ethanol (also commonly called alcohol) is a liquid at room temperature. It is found in many perfumes and deodorants. The diagram represents a molecule of ethanol.



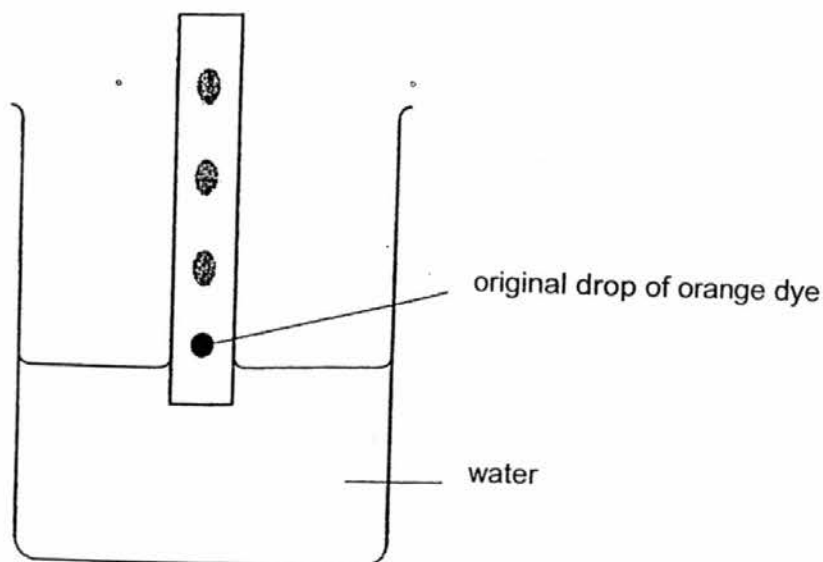
- (i) State the number of each type of atom present in the molecule.

.....[2]

- (ii) What is the formula of the molecule?

.....[1]

- (b) Dyes are used to colour some sweets. A student placed a drop of orange dye on a piece of filter paper. The end of the paper was then dipped into a beaker of water. The results are shown below.



- (i) What is the name of the process shown in the diagram?

.....[1]

- (ii) Is the orange dye a mixture or a compound? Give a reason for your answer.

.....
[2]

- (iii) What would have happened if the original drop of dye had been placed below the water level?

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

- (c) Given a mixture of iron, sulfur and copper sulfate crystals, how would you obtain iron and sulfur from the mixture?

.....
.....
.....
.....[3]

8 'A carbonate is found in egg shells and sea shells.'

- (a) (i) Using the properties of acid, describe how you would carry out a test to show that egg shells contain a carbonate. Draw a suitable labelled diagram to aid your explanation.

.....

.....

.....

.....

.....

.....

.....[5]

- (ii) Write a general equation for the reaction in your answer to (a)(i).

.....[2]

- (b) A laboratory technician forgets to label 3 bottles of colourless solution. He only knows that one solution has pH exactly 7, one has pH less than 7 and one has pH more than 7. He has one bottle of blue litmus paper and one bottle of red litmus paper available.

Describe what you would do to help the laboratory technician sort out the bottles and label the bottle as acid, alkali or neutral.

.....

.....

.....

.....

.....

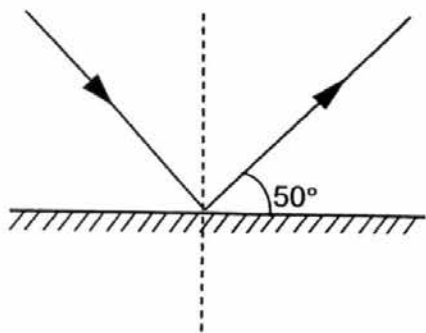
.....

.....

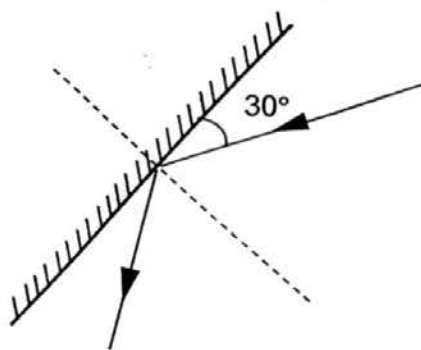
.....

.....[3]

9 (a) For each of the following light rays reflected, state the angle of incidence. [2]



(i) Angle of incidence = _____



(ii) Angle of incidence = _____

(b) An object is placed 5 cm in front of a plane mirror. The mirror is then moved 2 cm towards the object. Calculate the distance between the initial and final position of the image that is seen in the mirror.

distance =cm [2]

(c) What is the relationship between the angle of incidence and the angle of reflection for a light ray undergoing reflection?

.....
 [1]

(d) (i) State the two types of reflection.

..... [1]

(ii) State a difference between the two types of reflection.

.....
 [2]

(iii) State 2 properties of images in a plane mirror.

.....
 [2]

- End of Booklet B -

HENDERSON SECONDARY SCHOOL
MID-YEAR EXAMINATION 2016
SECONDARY TWO EXPRESS SCIENCE
 Marking Scheme

Section A (30 marks)

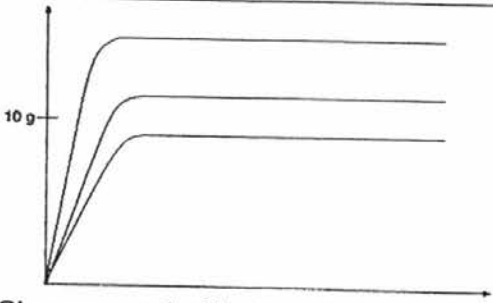
1	2	3	4	5	6	7	8	9	10
A	C	D	A	D	A	B	B	A	A

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

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

Section B (40 marks)

1	a	Mixture of two types of compounds. Compound. Mixture of molecules of an element and molecules of a compound. Atoms of an element. Mixture of two elements of diatomic molecules.	5															
	b	<u>Similarity:</u> Both are made up of two or more atoms chemically combined together. <u>Difference:</u> Molecules of a compound consist of different types of atoms chemically combined together while the molecules of an element consist of the same type of atoms chemically combined together.	1 1															
	c	<table><tr><td>element</td><td>mass number</td><td>atomic number</td><td>number of electrons</td><td>number of neutrons</td></tr><tr><td>W</td><td>27</td><td>13</td><td>13</td><td>14</td></tr><tr><td>X</td><td>23</td><td>11</td><td>11</td><td>12</td></tr></table>	element	mass number	atomic number	number of electrons	number of neutrons	W	27	13	13	14	X	23	11	11	12	2 1
element	mass number	atomic number	number of electrons	number of neutrons														
W	27	13	13	14														
X	23	11	11	12														

2	(a)	Solute P has higher solubility in water than solute Q. Remarks: Do not accept 'larger amount of solute P than Q can be dissolved in water'.	1
	(b)	It represents the maximum mass of solute that had dissolved in 50 cm ³ of water. Or It represents that the solution is saturated with the solute.	1
	(c)	 Show curve 1 with steep initial gradient but same saturation point.	1
	(d) (i)	Increase temperature of solvent / use hot water / heat up the mixture	1
	(ii)	More solute can dissolve (OR it saturates higher) because higher temperature will increase solubility . It is dissolved in a shorter time (OR steeper and saturates faster) because higher temperature increases the rate of dissolving .	1 1

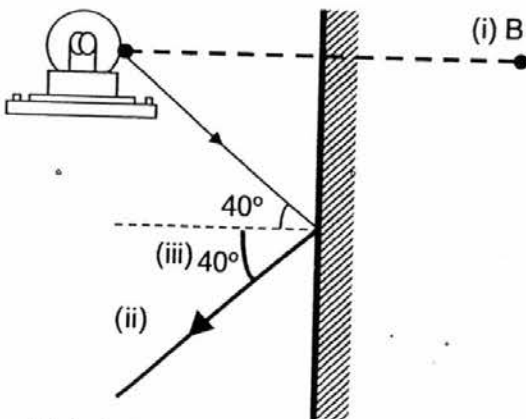
3	(a)	M : filtration, N : distillation	2
	(b)	N By boiling the mixture, water boils to become steam and condenses into water.	1 1

4	(a)	Identify: Solid candle wax melting to form liquid wax. Explain: Liquid wax can be cooled and solidified to form solid candle Or Melting is a reversible change. Remarks: Award mark as long as 'melting' is stated. Do not accept: 'No new substances formed'.	2
	(b)	Identify: Burning of the candle/wick. Explain: New product is formed / Carbon dioxide is produced Or Reaction is not reversible / irreversible. Remarks: Accept 'combustion'.	2
	(c) (i)	Oxygen	1
	(ii)	carbon + oxygen $\xrightarrow{\text{heat}}$ carbon dioxide	2

			Deduct 1 mark if 'heat' is not stated - reactants and/or products are written wrongly - no '+' sign in equation - no $\longrightarrow$ used in equation / straight, forward arrow only Do not accept if answer is written in pencil.	
--	--	--	--	--

5	(a)	(i)	combustion, chemical change	1
		(ii)	combination, chemical change	1
		(iii)	melting, physical change	1
	(b)	(i)	calcium hydroxide + nitric acid $\rightarrow$ water + calcium nitrate	2
		(ii)	zinc + nitric acid $\rightarrow$ hydrogen + zinc nitrate	2

6	(a)	The incident ray, refracted ray and normal all lie on the same plane at the point of incidence. For any two given media, the ratio of $\sin i / \sin r$ is a constant	1
	(b)	Reflection of light	1
	(c)	(i)	1
		(ii)	1
		(iii)	1



1m only if dot and labeled B , 0 m if no arrow

Section C (30 marks)

- 7a) i) 6 Hydrogen atoms, 1 oxygen atom and 2 carbon atoms. [Any 2=1, all 3 =2]
 ii) C_2H_5OH / C_2H_6O / CH_3CH_2OH [1]
- b) i) Chromatography [1]
- ii) Mixture. [1]
 As it can be separated into 3 components. [1]
- iii) The drop of dye would have dissolved into the water. [Any 1 = 1]
 OR The chromatogram would not have formed.
- c) Using a magnet, separate out the iron. [1]
 Add water to dissolve the copper sulfate as sulfur remains insoluble. [1]
 Filter to obtain sulfur as residue. [1]

- 8ai)** 1. Crush egg shells and place some in a test tube. [0]
 2. Add some acid to the egg shells and pass the gas produced into limewater [2]
 3. If white precipitate forms in the limewater, then the gas is carbon dioxide
 this shows that egg shells contains carbonate. [1]
 Labelled diagram: test pipette [1] Lime water [1]
- (ii)** Acid + Carbonate $\rightarrow$ Salt + water + carbon dioxide [Any 2/3/4=1, all 5 =2]
- (b)** Dip the blue litmus paper into a bottle of solution –turns red, then it is an acid. [1]
 If not, dip the red litmus as well – if it remains red, then the solution is neutral. [1]
 Use the red litmus on one of the two remaining solutions, the one that turns red litmus blue is
 an alkali [1]
- 9a** i) 40° ii) 60° [Any 1 =1, max 2]
- b)** $5 + 2 - 3$
 $=4\text{cm}$ [1]
 [1]
- c)** The angle of incidence equals the angle of reflection for a light ray on a plane surface. [1]
- di)** Diffuse and smooth / Regular and irregular [1]
- ii)** The angle of incidence equals the angle of reflection for a light ray in regular reflection, does
not equal in irregular reflection. [1]
 Regular reflection occurs on a smooth surface but regular reflection occurs on a rough
 surface. [1]
 Accept any other reasonable answer. [1]
- iii)** The image is laterally inverted.
 Image distance is equal to object distance.
 The image is the same size as the object.
 The image is virtual.
 The image is upright. [Any 1 =1, max 2]

- End of Examination Marking Scheme -