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Name:() Class: Sec



St. Gabriel's Secondary School

2016 First Semestral Examination

Subject : Lower Secondary Science
Level/Stream : Sec 1 Express
Duration : 1 hour
Date : 5 May 2016
Setter : Mr Lim Chin Min / Mr Lee Lian Siong

Additional materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

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

Write your name, register number and class in the spaces above.

Section A

Answer ALL the questions using the multiple choice answer sheet provided.

Four suggested answers are given for each question.

Choose the best answer and use a 2B pencil to shade each corresponding bubble clearly.

Each question carries one mark.

The total marks for this section is 15 marks.

Submit the question booklet and multiple choice answer sheet separately.

Section B

Answer ALL the questions in Section B. The total marks for this section is 25 marks.

Section C

Answer ALL questions in the spaces provided. The total marks for this section is 20 marks.

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

A copy of the Periodic Table is found on page 14.

60

This question booklet consists of 14 printed pages including this cover page.

SECTION A : MULTIPLE-CHOICE QUESTIONS [15 marks]

1 Which of the following hazard symbols should be used to label a bottle of kerosene?

A



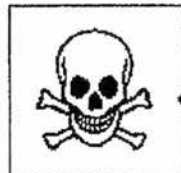
C



B

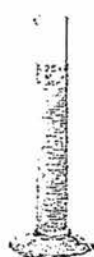


D

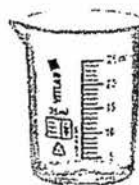


2 Which of the following laboratory apparatus should be used to measure an accurate fixed volume of liquid of 25.0 cm^3 ?

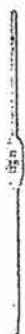
A



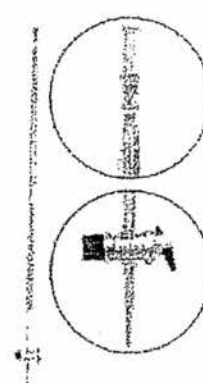
C



B



D



3 Which of the following physical quantity is **correctly** paired with its S.I. unit?

	Physical Quantity	S.I. unit
A	Volume	Cubic metre
B	Temperature	Degree Celsius
C	Electric current	Candela
D	Mass	Gram

- 4 Which of the following is the most appropriate instrument to measure a thickness of 0.050 cm?
- A Metre rule
B Measuring tape
C Vernier Calipers
D Micrometer screw gauge
- 5 The part of the micrometer screw gauge used for checking if the object being measured is gripped properly is called the _____.
- A anvil
B thimble
C ratchet
D spindle
- 6 A man measures his weight at sea level using a balance and finds that it is 600 N. What will be his weight if he weighs himself on Mount Everest which is 8 848 m above sea level?
- A 0 N
B Slightly more than 600 N
C Slightly less than 600 N
D 6 000 N
- 7 What is meant by the term *gravitational field*?
- A It is a region of space in which a mass experiences a gravitational force.
B It is the gravitational force per unit mass.
C It is the force that Earth exerts on all objects.
D It is the amount of matter in a body.
- 8 The density of a metal bar is 12.0 g/cm³. When the metal bar is cut into half, what will be its new density?
- A 6.0 g/cm³
B 12.0 g/cm³
C 24.0 g/cm³
D Cannot be determined as volume is not given
- 9 A piece of aluminium sheet was hit by a hammer repeatedly and did not break. This shows that aluminium is _____.
- A dense
B hard
C malleable
D ductile
- 10 Which one of the following pairs of elements **does not** belong to the same group of the Periodic Table?
- A sodium and potassium
B magnesium and calcium
C fluorine and chlorine
D oxygen and nitrogen

11 Which of the following list of substances consists of only compounds?

- A Sugar, water and carbon dioxide
- B Rain, steel and calamine lotion
- C Sugar solution, sodium chloride and air
- D Ethanoic acid, orange juice and muddy water

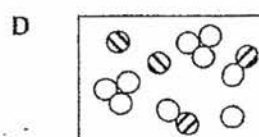
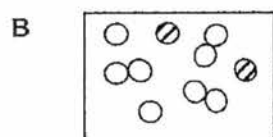
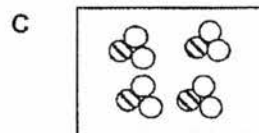
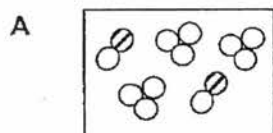
12 When an unknown red solid is heated strongly, it forms a silvery liquid and a gas is given off. What deduction can be made about the red solid?

- A It is an element.
- B It is a compound.
- C It is a mixture of elements.
- D It is a mixture of compounds.

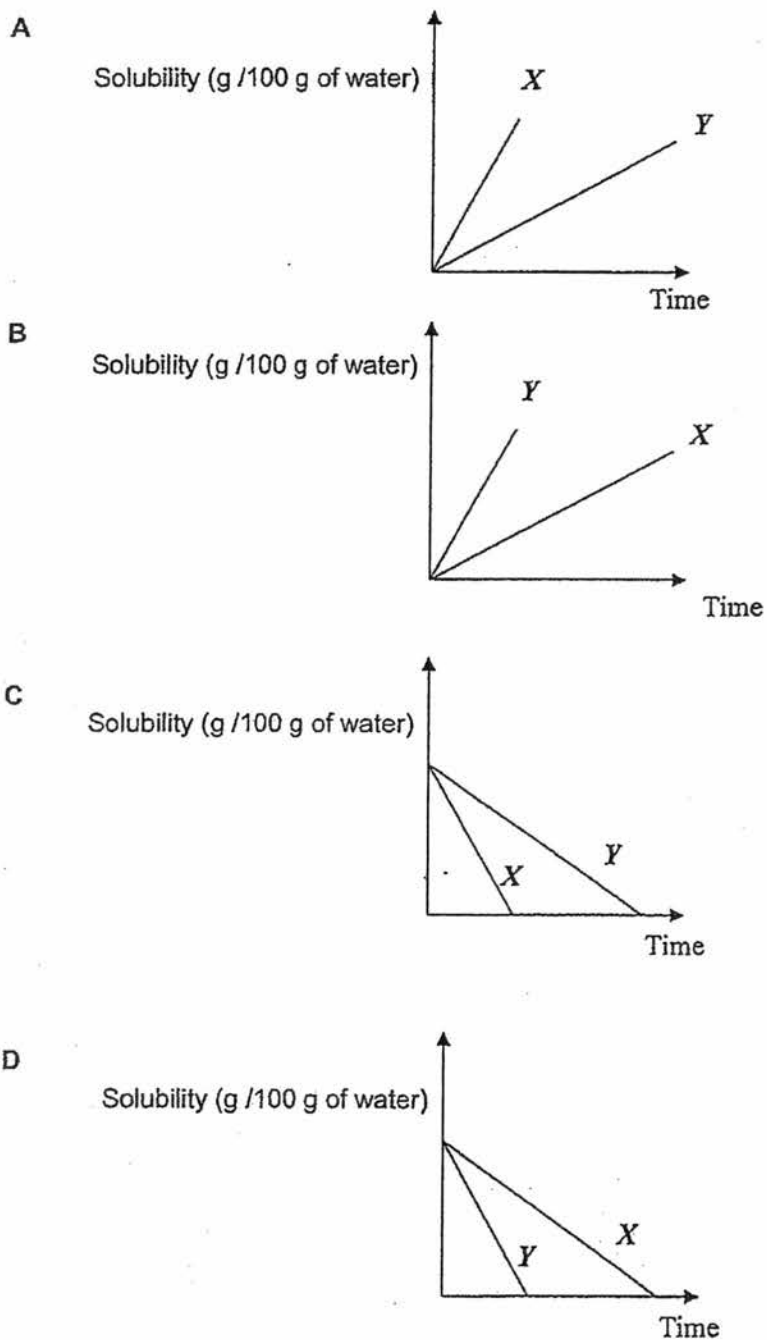
13 Which of the following is an example of a solution?

- | | |
|-------------|--------------|
| A Milk | C Mayonnaise |
| B Egg white | D Pepsi |

14 Which of the following best represents a mixture of element(s) and compound(s)?



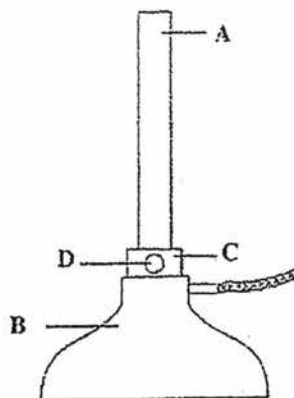
- 15 In an investigation, two substances *X* and *Y* of the same mass are dissolved in the same volume of water. It is found that *X* dissolves faster than *Y*. Which of the following graphs correctly shows the solubility of the substances against time in this investigation?



Section B : Short Structured Questions (25 Marks)

Answer all the questions in the spaces provided.

- 1 The diagram below shows a Bunsen Burner.



- (a) Name the parts labeled A, B and C and state their functions in the table below.

[3]

	Name	Function
A		
B		
C		

- (b) Describe one difference between the flame produced when D is fully opened and when it is totally closed.

[1]

.....

- (c) What causes a "strikeback" in the Bunsen burner?

[1]

.....

2 Name the most appropriate instrument to measure each of the following: [2]

- (a) The timing of a chemical reaction :
- (b) The circumference of a beaker :
- (c) The thickness of the Science textbook :
- (d) The thickness of a copper wire :

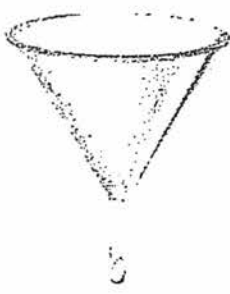
3 Convert the following into the units as listed. [2]

(a) $20 \text{ m}^2 = \dots\dots\dots \text{cm}^2$

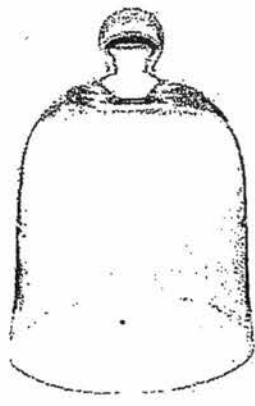
(b) $40 \text{ m/s} = \dots\dots\dots \text{km/h}$

4 Draw the schematic diagram of the following apparatus and state their functions. [6]

(a)	<u>Schematic Diagram</u>	<u>Function</u>
		

(b)	<u>Schematic Diagram</u>	<u>Function</u>
		

(c)

	<u>Schematic Diagram</u>	<u>Function</u>
		

5 The chemical formula of a compound is NaPFO_3 .

(a) Name the elements present in this compound.

[1]

.....

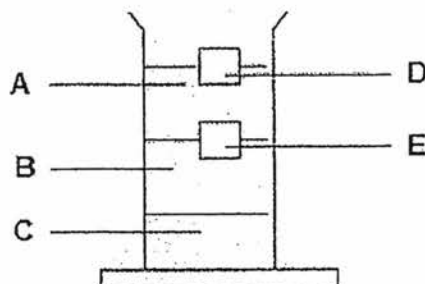
.....

(b) Which of the elements in this compound is able to conduct electricity?

[1]

.....

6 John placed 5 different substances into a cylinder as shown in the diagram below. The densities of the substances are given in the following table.



Substance	Density (g/cm^3)
Glycerine	1.3
Water	1.0
Alcohol	0.79
Cork	0.25
Ice	0.92

(a) Give the letter which represents the substance, alcohol.

[1]

.....

- (b) Explain how a steel ship weighing several tonnes can float in the ocean. [2]

.....

.....

- 7 An experiment was done to find out how much sugar can dissolve in different solvents. Study the results in the table below and answer the questions that follow.

Type of Solvent	Number of cubes of sugar that can dissolve in 100 ml of solvent
Water	10
Alcohol	4
Cooking Oil	less than 1
Turpentine	4

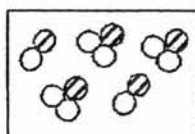
- (a) In which solvent is the solubility of sugar the highest? [1]

- (b) In an effort to increase the number of cubes of sugar that can be dissolved in 100 ml of alcohol, Dylan suggests stirring the mixture. Suggest, with an explanation, whether Dylan's suggestion will work. [2]

.....

.....

Substance X is dissolved in water and the following is a representation of the resulting product.



- (c) State one difference between a mixture and a compound.

.....

.....

- (d) Using the terms **compound(s)**, **element(s)** or **mixture(s)**, fill in the blanks in the statement below.

"The resulting product when X dissolves in water is a of

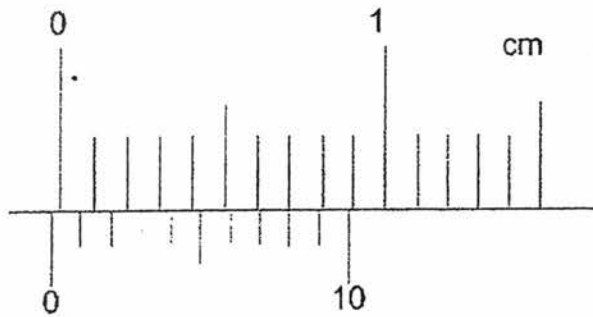
two different Altogether, in the , there are

three different"

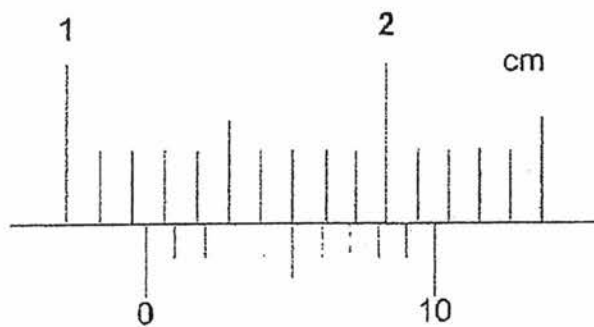
SECTION C : FREE RESPONSE QUESTIONS [20 marks]

Answer **ALL** questions in the spaces provided and write down the appropriate units (if applicable) for each answer.

- 1 A vernier caliper is used to measure the diameter of a small metal ball. The diagrams below show the readings when the jaws of the vernier caliper are completely closed and when it is taking the measurement of the metal ball.



Reading when jaws of vernier caliper are completely closed



Reading when measuring diameter of metal ball

- (a) What is the zero error of the vernier calipers? [1]

Zero error =

- (b) What is the diameter of the metal ball? [2]

Diameter =

- (c) What is the volume of the metal ball? [1]

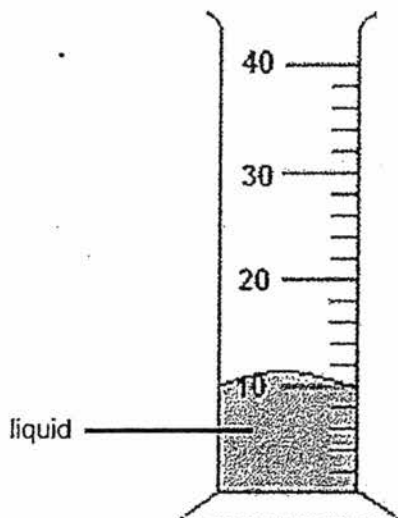
(You may use the formula $V = 0.524 \times d^3$ where V is the volume of the metal ball and d is the diameter of the metal ball. Correct your final answer to 1 decimal place.)

Volume of each metal ball =

- (d) Given the mass of the metal ball is 20 g, what is the density of the metal? [1]

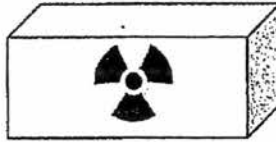
Density of the metal =

- (e) There is another method to determine the volume of the metal ball. It involves the use of apparatus shown in the following diagram.



- (i) If 10 metal balls are immersed into the liquid, draw the new liquid level on the diagram above. [1]
- (ii) On the same diagram, draw how the eye should be placed to avoid parallax error when reading off the apparatus to find the volume of the new liquid level. [1]
- (iii) What could be the liquid used in the diagram? [1]
.....
- (iv) Suggest a value for the density of the liquid used in the diagram. [1]
.....
- (v) If a large metal block is given instead of a small metal ball, suggest an alternative apparatus to measure the volume of the metal block. [1]
.....

- 2 An astronaut was tasked to bring a sealed box of substance, as shown in the diagram, from Earth to Moon.



On Earth, the astronaut measured the weight of the sealed box to be 1000 N at sea-level.

On the way to Moon, the astronaut found himself floating in the spacecraft mid-way through the journey.

As the spacecraft landed on Moon, the astronaut found himself coming down to the floor of the spacecraft.

You may assume the gravitational field strength of Earth to be 10 N/kg and the gravitational field strength of Moon to be 1.7 N/kg.

- (a) What kind of substance was the astronaut carrying? [1]

- (b) Suggest appropriate instruments to measure **mass** and **weight** on moon. [2]

An appropriate instrument to measure **mass** on moon is

An appropriate instrument to measure **weight** on moon is

- (c) Apart from the answers to part (b), state two other differences between the terms **mass** and **weight**. [2]

1st difference:

.....

2nd difference:

.....

- (d) What is the mass of the sealed box? [2]

Mass of the sealed box =

- (e) What is the weight of the sealed box when the astronaut is floating in the spacecraft? [1]

Weight of the sealed box =

- (f) What is the weight of the sealed box when the spacecraft landed on Moon? [2]

Weight of the sealed box =

[End of Paper]

The Periodic Table of the Elements

Group

I	II											III	IV	V	VI	VII	0
1 H hydrogen 1																	
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	98 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	210 Po polonium 84	210 At astatine 85	210 Rn radon 86
87 Fr francium	88 Ra radium	89 Ac actinium															

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

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	238 Pa protactinium 91	238 U uranium 92	238 Np neptunium 93	238 Pu plutonium 94	238 Am americium 95	238 Cm curium 96	238 Bk berkelium 97	238 Cf californium 98	238 Es einsteinium 99	238 Fm fermium 100	238 Md mendelevium 101	238 No nobelium 102	238 Lr lawrencium 103

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

Key	a	X	b
-----	---	---	---

Key

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

The volume of one mole of any gas is 24 dm^3 at room temperature and

2016 Sec 1E LSS SA1 Answers

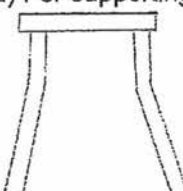
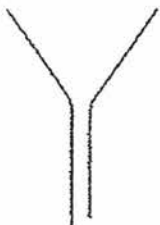
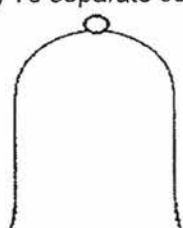
Section A:

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B	B	A	D	C	C	A	B	C	D
Q11	Q12	Q13	Q14	Q15					
A	B	D	D	A					

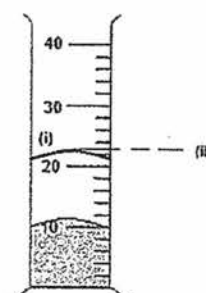
A – 3, B – 4, C – 4, D – 4

Section B

1	a) A – Barrel, to raise the flame to a suitable height for heating [0.5, 0.5] B – Base, to hold / support barrel upright and in correct position or to keep bunsen burner steady [0.5, 0.5] C – Collar, to open or close the air-hole/ to control the amount of air entering the barrel [0.5, 0.5] b) <table><tr><th>D is closed (Luminous flame)</th><th>D is opened (Non-luminous flame)</th></tr><tr><td>Colour is orange/yellow</td><td>Colour is blue</td></tr><tr><td>Flame is not steady</td><td>Flame is steady</td></tr><tr><td>Produce soot</td><td>Does not produce soot</td></tr><tr><td>Easy to see</td><td>Not easy to see</td></tr><tr><td>Not as hot/ lower temperature</td><td>Hotter/ higher temperature</td></tr><tr><td>Not suitable for heating</td><td>Suitable for heating</td></tr></table> c) The bunsen burner is lighted/ignited with the air-hole opened [0.5m if only opened air-hole is stated] OR Too much air in the barrel [0.5] which causes flame to shoot back into barrel [0.5]	D is closed (Luminous flame)	D is opened (Non-luminous flame)	Colour is orange/yellow	Colour is blue	Flame is not steady	Flame is steady	Produce soot	Does not produce soot	Easy to see	Not easy to see	Not as hot/ lower temperature	Hotter/ higher temperature	Not suitable for heating	Suitable for heating	[0.5, 0.5] [0.5, 0.5] [0.5, 0.5] [0.5, 0.5] [1]
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Colour is orange/yellow	Colour is blue															
Flame is not steady	Flame is steady															
Produce soot	Does not produce soot															
Easy to see	Not easy to see															
Not as hot/ lower temperature	Hotter/ higher temperature															
Not suitable for heating	Suitable for heating															
2	a) stopwatch [0.5] b) measuring tape [0.5] c) vernier calipers / external callipers/ metre rule/ micrometer screwgauge/ measuring tape [0.5] d) micrometer screwgauge [0.5]															
3	a) 20 00 00 cm² [1] b) 144 km/h [1]															

4	a) For supporting apparatus [0.5] during heating [0.5]  b) For transferring liquid into containers with a small opening/ For separating solids from liquids [0.5] by use of filter paper [0.5]  c) To separate setup of an experiment from the surroundings  [0.5 mark given for each drawing if ruler not used]	[1, 1] [1, 1] [1, 1]						
5	a) sodium, phosphorus, fluorine, oxygen (0.5 mark for at least 2 correct elements) b) sodium	[1] [1]						
6	a) A b) The hull of the ship is hollow/ filled with air and the average density of the ship is lower than seawater.	[1] [1, 1]						
7	a) water b) Dylan's suggestion will not work. Stirring only increases rate of dissolving and not solubility of sugar in alcohol. c) <table><thead><tr><th>Mixture</th><th>Compound</th></tr></thead><tbody><tr><td>made up of 2 or more substances <u>not</u> chemically combined together</td><td>made up of <u>2 or more elements</u> chemically combined together.</td></tr><tr><td>can be separated by any physical methods like</td><td>cannot be separated by any physical methods like</td></tr></tbody></table>	Mixture	Compound	made up of 2 or more substances <u>not</u> chemically combined together	made up of <u>2 or more elements</u> chemically combined together.	can be separated by any physical methods like	cannot be separated by any physical methods like	[1] [1, 1] [1]
Mixture	Compound							
made up of 2 or more substances <u>not</u> chemically combined together	made up of <u>2 or more elements</u> chemically combined together.							
can be separated by any physical methods like	cannot be separated by any physical methods like							

Section C

Section C											
1	(a)	Zero error = - 0.02 cm	[1]								
	(b)	Reading = 1.25 cm Diameter = 1.25 - (- 0.02) = 1.27 cm [Allow ecf]	[1] [1]								
	(c)	V = 0.524 x (1.27) ³ = 1.1 cm ³ (1 dp) [Allow ecf]	[1]								
	(d)	Density = 20 / 1.1 = 18.2 g/cm ³ (3sf) [Allow ecf]	[1]								
	(e)	 i) [Allow ecf] Accept 11+11=22 or 12+11=23cm³ iii) Mercury iv) 13.6 g/cm³ (Accept any answer lower than (d)) v) Displacement can/ Eureka can (Wrong or no units, whole question minus 1)	[1] [1] [1] [1] [1]								
2	(a)	Radioactive/ Uranium	[1]								
	(b)	Beam balance Spring balance	[1] [1]								
	(c)	<table border="1"> <thead> <tr> <th>Mass</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>Amount of matter/ substance in a body</td> <td><u>Gravitational</u> force acting on a body.</td> </tr> <tr> <td>kg or kilogram</td> <td>N or newton</td> </tr> <tr> <td>Independent of gravitational field strength/ location</td> <td>Dependent on gravitational field strength/ location</td> </tr> </tbody> </table>	Mass	Weight	Amount of matter/ substance in a body	<u>Gravitational</u> force acting on a body.	kg or kilogram	N or newton	Independent of gravitational field strength/ location	Dependent on gravitational field strength/ location	[0.5, 0.5] [0.5, 0.5]
Mass	Weight										
Amount of matter/ substance in a body	<u>Gravitational</u> force acting on a body.										
kg or kilogram	N or newton										
Independent of gravitational field strength/ location	Dependent on gravitational field strength/ location										
	(d)	Mass = 1000 / 10 = 100 kg	[1, 1]								
	(e)	Weight = 0 N	[1]								
	(f)	Weight = 100 x 1.7 = 170 N [Allow ecf]	[1, 1]								
		(Wrong or no units, whole question minus 1)									

	filtration, evaporation, etc.	filtration, evaporation, etc.	
	<u>No</u> chemical change or reaction must occur in order to form a mixture	To form a compound, a chemical change or reaction <u>must</u> occur	
	A mixture has <u>no fixed boiling or melting point</u> .	Pure compound has <u>a fixed boiling or melting point</u>	
	A mixture has the properties of the substances that make it up.	A compound <u>doesn't</u> have the properties of the elements that make it up.	
	d) mixture, compounds, mixture, elements (0.5 mark for at least 2 correct blanks)		[1]