Name: ………………………………………………………… (   )   Class: ……………

ASSUMPTION ENGLISH SCHOOL
END OF YEAR EXAMINATION 2019

LOWER SECONDARY SCIENCE
BOOKLET A

LEVEL:	Sec 1 Express	**DATE:**	8 October 2019
CLASS(ES):	Sec 1/1, 1/2, 1/3, 1/5 (SBB)	**DURATION:**	2 hours (For booklets **A** and **B**)

Additional Materials provided: 1 sheet of OAS paper

INSTRUCTIONS TO CANDIDATES
Do not open this booklet until you are told to do so.

Write your NAME, INDEX NUMBER and CLASS at the top of this page and on the OAS paper.
Shade your index number on the OAS paper.

This paper consists of three sections.

Booklet A :	Section A	- Multiple-Choice Questions
Booklet B :	Section B	- Short Structured Questions
	Section C	- Long Structured Questions

SECTION A (30 marks)
Multiple-Choice Questions
There are 30 questions in this section. Answer **all** questions. For each question, there are four possible answers A, B, C and D. **Choose the correct answer and record your choice in soft or 2B pencil on the OAS paper provided. DO NOT fold or bend the OAS paper.**

A copy of the Periodic Table is printed on the last page of Booklet **B**.

At the end of the examination, hand in your OAS paper, Booklets **A** and **B** separately.

This Question Paper consists of 15 printed pages including this page.

[Turn over

SECTION A: Multiple-Choice Questions (30 marks)

There are **thirty** questions in this section. 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 on the OAS paper in soft pencil.

1 Which statement(s) is / are true?

I Advancements in science are always beneficial to society.
II Science is the study of our physical world.
III Scientific knowledge is derived from observations.
IV We use instruments to help us make accurate measurements.

A **I** and **II** only
B **III** and **IV** only
C **II**, **III** and **IV** only
D all of the above

2 The following symbols were found on a bottle of reagent.

Which of the following does / do not show the safety precaution(s) that should be taken when using this reagent?

I Do not leave it near an open flame.
II Using a stopper to seal the reagent after use to prevent vapours from escaping in to the surrounding.
III Use special protective gear during handling.

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

3 Jordan noticed that after several rounds of washing, some of his T-shirts shrank in size.

He then conducted a scientific investigation.

I Jordan measured the size of the T-shirts after the wash and recorded them in a table.

II Jordan concluded that cotton results in greater shrinkage.

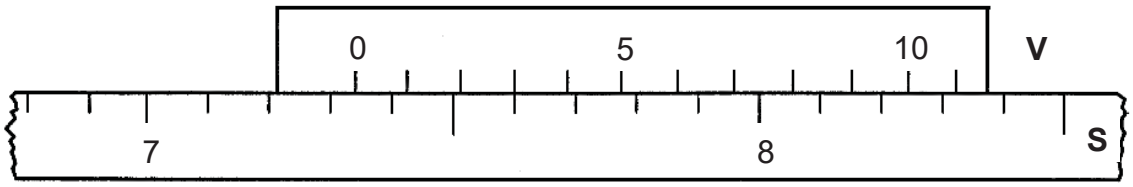
III Jordan chose two T-shirts, made up of cotton and polyester respectively, and washed them under the same conditions.

IV Jordan predicted that the materials of the T-shirts affect whether they would shrink in size after washing.

Which of the following correctly corresponds with the key elements of the scientific method?

	formulating hypothesis	collecting data	carrying out experiment	interpreting data
A	**II**	**III**	**I**	**IV**
B	**III**	**I**	**IV**	**II**
C	**IV**	**III**	**I**	**II**
D	**IV**	**I**	**III**	**II**

4 The diagram below shows the reading for the length of an object measured by a vernier caliper, with its vernier scale **V** placed against the main scale **S**.



What is the reading shown?

A 7.23 cm

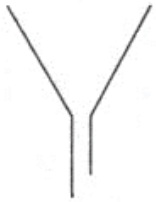
B 7.26 cm

C 7.33 cm

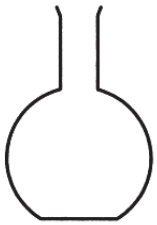
D 7.36 cm

5 Which diagram is the correct scientific drawing for a conical flask?

A

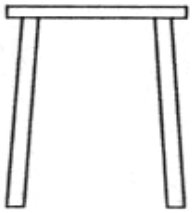


B

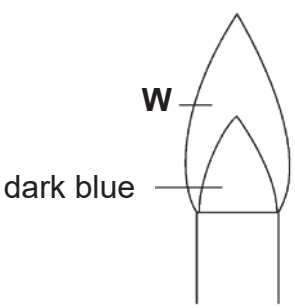


C

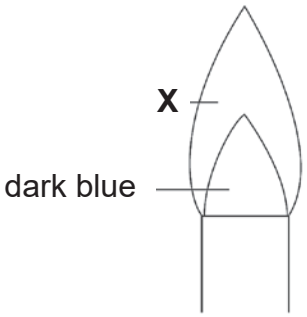
D



6 The air-hole of a Bunsen burner can be opened or closed to obtain two types of flame. The colours of the flame are labelled in the diagram below.



flame of a Bunsen burner with the air-hole **opened**



flame of a Bunsen burner with the air-hole **closed**

Which option correctly states the colours of **W** and **X**?

	W	**X**
A	blue	blue
B	blue	orange
C	orange	blue
D	orange	orange

7 The table below shows a scratch test carried out for bronze, zinc, iron and titanium.
If substance **X** scratches substance **Y** and a scratch mark is left on substance **Y**, a tick (✓) is put in the box. Otherwise, a cross (×) is put in the box.

X \ **Y**	bronze	zinc	iron	titanium
bronze		✓	×	×
zinc	×		×	×
iron	✓	✓		×
titanium	✓	✓	✓	

Arrange the substances according to **increasing** hardness.

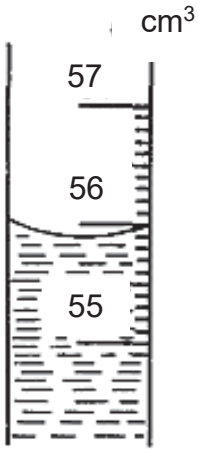
A titanium, iron, bronze, zinc

B titanium, zinc, iron, bronze zinc, iron, bronze, titanium

C zinc, bronze, iron, titanium

D zinc, iron, bronze, titanium

8 The diagram shows some liquid in a measuring cylinder. What is the volume of the liquid?



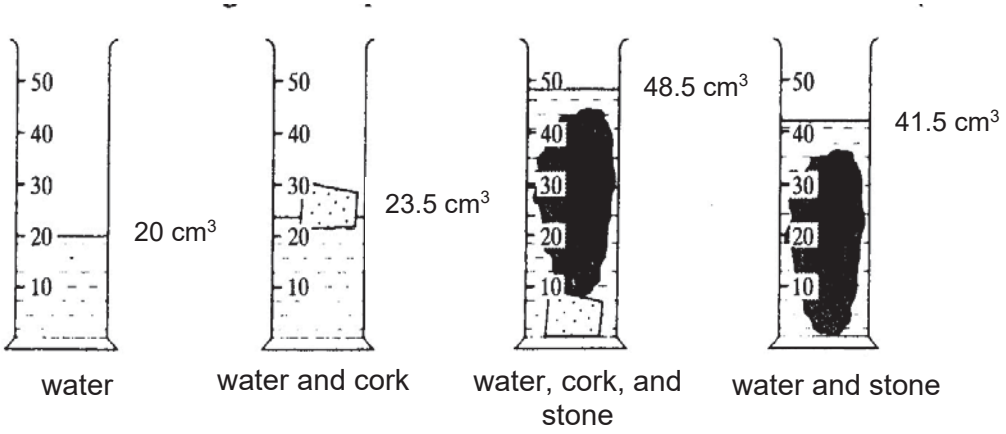
A 55.8 cm^3

B 55.9 cm^3

C 56.0 cm^3

D 56.1 cm^3

9 A student has to find the volume of the cork by using a measuring cylinder. The cork floats, so he uses a stone to keep it under the water. He then measures the volume of the stone. The results for each stage of the experiment are shown.



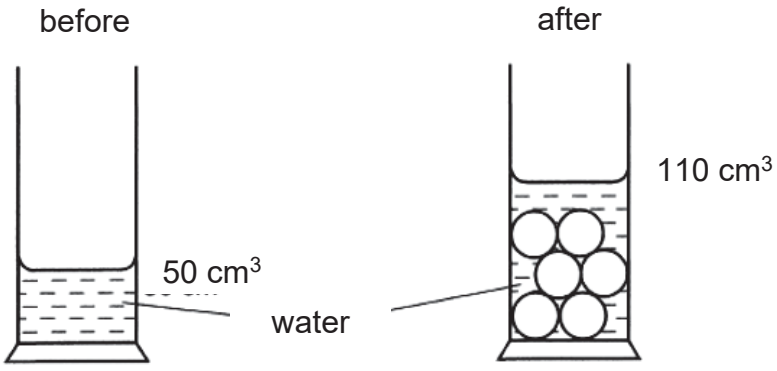
What is the volume of the cork?

A 3.5 cm^3 **B** 7.0 cm^3

C 18.0 cm^3 **D** 21.5 cm^3

10 A student drops six identical aluminium balls, each of mass 27 g, into a measuring cylinder containing water.

The diagram below shows the measuring cylinder before and after adding the balls.

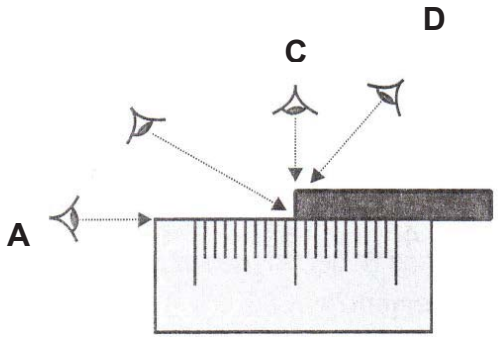


What is the density of the aluminium balls?

A 0.4 g/cm^3 **B** 2.7 g/cm^3

C 60 g/cm^3 **D** 162 g/cm^3

11 At which position should the student be taking the reading so as to avoid parallax error?



12 Which property is the reason why tungsten is a suitable material for a filament in a light bulb?

A flexibility

B hardness

C melting point

D strength

13 Tyres are made of ……. as it is …….. and can withstand high temperature and friction.

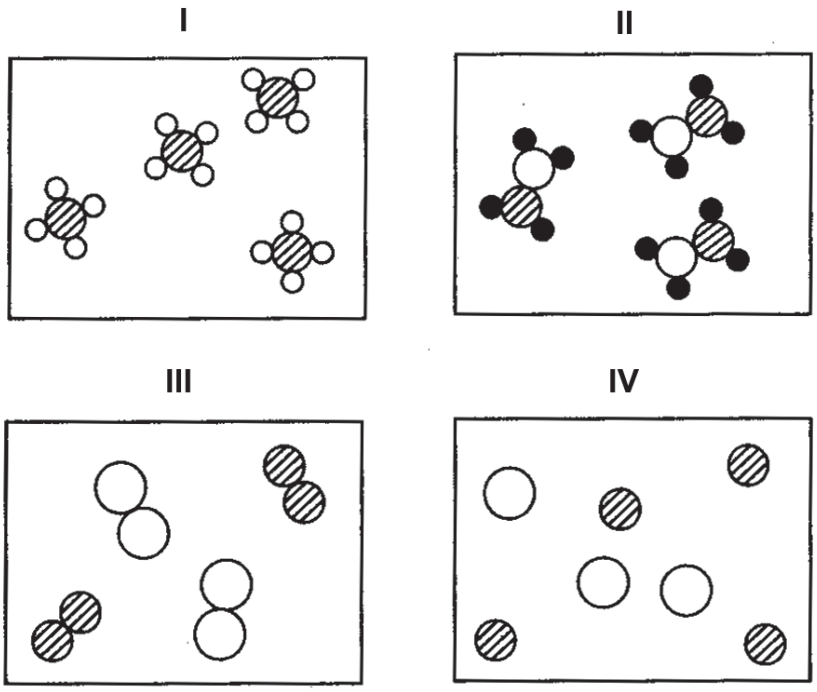
A plastic, less dense than water

B metal, malleable

C rubber, elastic

D metal, malleable

14 Which diagram shows a mixture of two different elements?



A **I** only

B **I** and **II** only

C **III** and **IV** only

D all of the above

15 Decomposition occurs when sugar is heated to form carbon and water vapour. Which statement about decomposition is true?

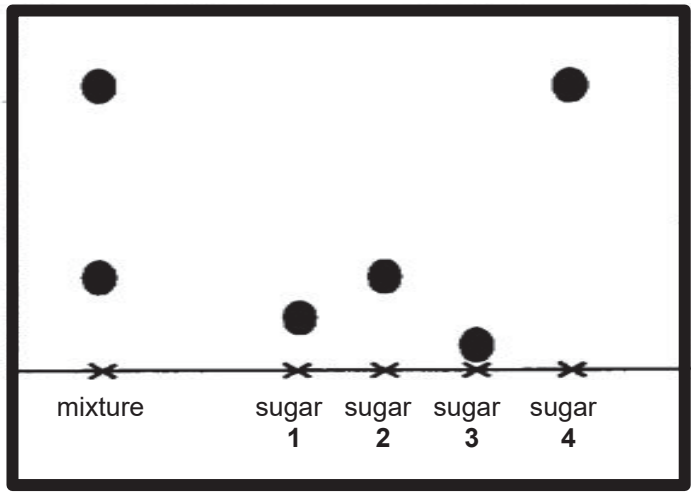
A Compounds are broken down into simpler substances.

B Compounds combine to form new compounds.

C Elements are broken down into simpler substances.

D Elements combine to form compounds.

16 A mixture containing two types of sugar is analysed using chromatography and compared against four other types of sugar. The result is shown below.



Which two sugars does the mixture contain?

A **1** and **2**
B **1** and **4**
C **2** and **4**
D **3** and **4**

17 Rice is an important part of the diet to people in some countries, which supplies the body with the nutrient carbohydrate. There are many types of rice and the existence of this variety is important.

Which is **not** one of the reasons why a variety in rice is important?

A Different rice crops can be grown in different climates.
B Different rice crops can be grown in different types of soil.
C Some rice crops are pest-resistant and these crops help to prevent the rice species from being wiped out.
D Humans can pick the type of nutrients they want.

18 A student wants to construct a dichotomous key to classify the different plants that can be found in garden.

Which question should he ask when classifying them?

I Are there organisms living on each plant?
II Do the leaves have smooth or jagged edge?
III How many leaves does each plant have?
IV How many types of plants are there in the garden?

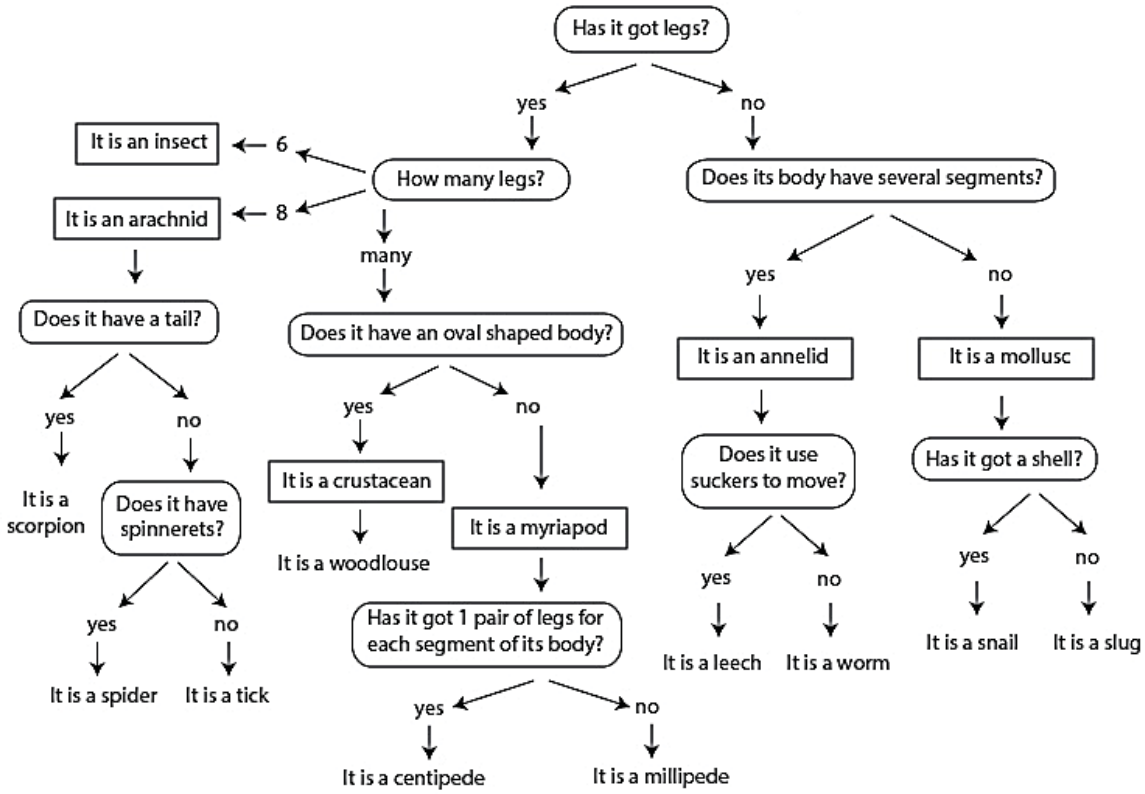
A **I** and **II** only

B **II** and **III** only

C **I, II** and **III** only

D **II, III** and **IV** only

Use the dichotomous key below to answer questions 19 and 20.



Ezekiel studies a black organism that has a long, tubular, and segmented body. This organism moves using its multiple legs attached to each segment of its body.

19 What is the identity of this organism?

A centipede

B leech

C slug

D spider

20 Which statement is correct about both spiders and ticks?

A They both have spinnerets.

B They both have tails.

C They are arachnids.

D They are insects.

21 A tiger invaded a village near a forest.
Which are possible causes of this incident?

I The tigers were over-hunted.
II The tigers no longer had a source of food.
III The natural habitat of the tigers was destroyed.
IV The tigers were infected by a type of bacteria.

A **I** and **II** only
B **II** and **III** only
C **III** and **IV** only
D all of the above

22 The brain is an organ because …….

A it has different tissues working together.
B It has different organelles working together.
C it has different types of cells working together.
D it is part of the nervous system.

23 Division of labour in an organism is important because …….

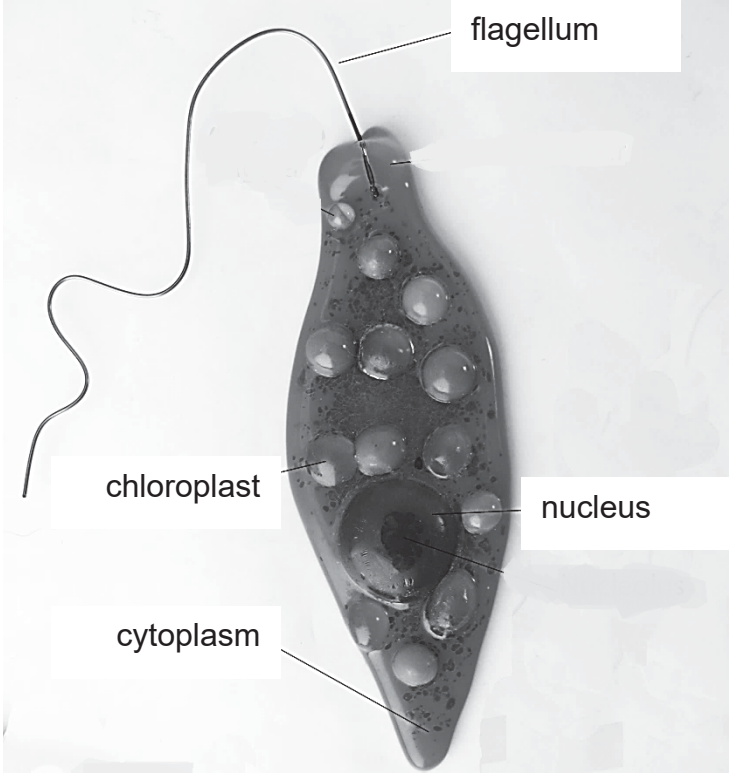
A cells in multicellular organisms have specific functions.
B cells performing similar functions group together to form tissues.
C the nucleus controls the activities in the cell.
D work is broken down into specific tasks for maximum efficiency.

24 An amoeba had its nucleus removed. For several days, it continued to move and feed but it did not reproduce. A normal amoeba reproduced twice in that time. What conclusion can be drawn using the information given?

A The nucleus is necessary for cell growth.
B The nucleus is necessary for reproduction.
C The nucleus is necessary for the release of energy.
D The nucleus is the site for chemical reactions in the cell.

Use the image below to answer questions 25 and 26.

Scientists discovered a new organism, **A**, living in the depth of a pond. The labelled image below shows organism **A**.



25 Which statement is correct about organism **A**?

A Organism **A** is an animal cell as it does not have a cell wall.

B Organism **A** is a plant cell as it possesses chloroplast only.

C Organism **A** is a plant cell as it possesses cytoplasm and a nucleus.

D Organism **A** is an animal cell because it has a flagellum.

26 Which part of organism **A** is the site of many chemical reactions?

A chloroplast

B cytoplasm

C flagellum

D nucleus

27 Which diagram represents the arrangement of particles during the process of condensation?

A

B

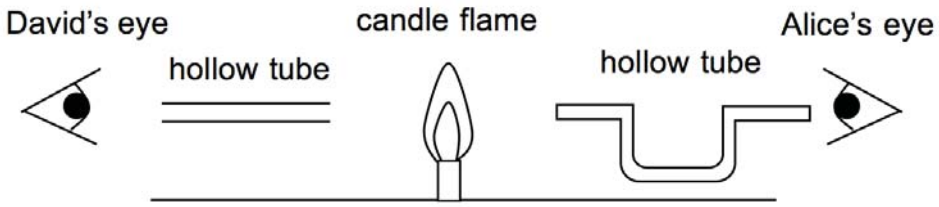
C

D

28 Which row shows the correct relative charges of the sub-atomic particles of an atom?

	proton	neutron	electron
A	–1	0	+1
B	0	+1	–1
C	+1	0	– 1
D	+1	–1	0

29 In the experimental set-up shown below, Alice looks through a U-shaped hollow tube while David looks through a straight hollow tube. Both hollow tubes are at the same short distance away from a candle flame.



Which statement about the set-up above is correct?

A Both Alice and David can see the candle flame.

B Both Alice and David cannot see the candle flame.

C Only Alice can see the candle flame.

D Only David can see the candle flame.

30 When a green object is illuminated by a coloured light it appears black. Which colour could the light be?

A cyan

B green

C yellow

D red

- END OF BOOKLET A -

Name: .... (   )   Class: ....

ASSUMPTION ENGLISH SCHOOL
END OF YEAR EXAMINATION 2019

LOWER SECONDARY SCIENCE
BOOKLET B

LEVEL: Sec 1 Express　　**DATE:** 8 October 2019

CLASS(ES): Sec 1/1, 1/2, 1/3, 1/5 (SBB)　　**DURATION:** 2 hours (For booklets **A** and **B**)

Additional Materials provided: NIL

INSTRUCTIONS TO CANDIDATES
Do not open this booklet until you are told to do so.

Write your NAME, INDEX NUMBER and CLASS at the top of this page This paper consists of 2 sections.

SECTION B (40 marks)
Short Structured Questions
Answer **all** questions. Write your answers in the spaces provided on the question paper.

SECTION C (30 marks)
Long Structured Questions
Answer **all** questions. Write your answers in the spaces provided on the question paper.

For Examiner's use:	
Section A	/ 30
Section B	/ 40
Section C	/ 30
Total	/ **100**

At the end of the examination, hand in your OAS paper, Booklets **A** and **B** separately.

Section B: Short Structured Questions (40 marks)
Answer **ALL** the questions and show all workings clearly in the spaces provided.

1 Caleb carried out an experiment to find out the relationship between the mass of a ball and how fast it falls from a height.

The results of the experiment are shown in the table below.

experiment	mass of ball / kg	height it is dropped from / m	time taken to reach ground / s
A	0.5	1	0.252
B	1.0	1	0.252
C	1.5	1	0.252
D	2.0	1	0.252

(a) Identify the variables in the experiment:

(i) the independent variable,

…….. [1]

(ii) the dependent variable,

…….. [1]

(iii) the constant variable.

…….. [1]

(b) Suggest a conclusion Caleb can make with the results of this experiment.

…….. [1]

(c) Suggest two equipment that Caleb need in order to conduct his experiment as accurately as possible. Indicate clearly the variable that the equipment measures.

Equipment	Measured Variable

[2]

2 The table below shows the atomic number and mass number of six atoms of elements, represented by the letters **P** to **U**. The letters are not the symbols of the elements.

atom	**P**	**Q**	**R**	**S**	**T**	**U**
atomic number	1	3	7	9	13	
mass number	1			19	27	40
No. of electrons	1	3	7			18
No. of neutrons		4	8	10	14	22

(a) Complete the table above. [3]

(b) Use the letters **P** to **U** to answer the following questions. You may use the letter once, more than once, or not at all.

State the atom(s) with

(i) with 8 electrons in its outermost shell,

…… [1]

(ii) which are metallic elements,

…… [1]

(iii) the same electronic configuration as a fluorine atom,

…… [1]

(iv) which combines with oxygen to form water.

…… [1]

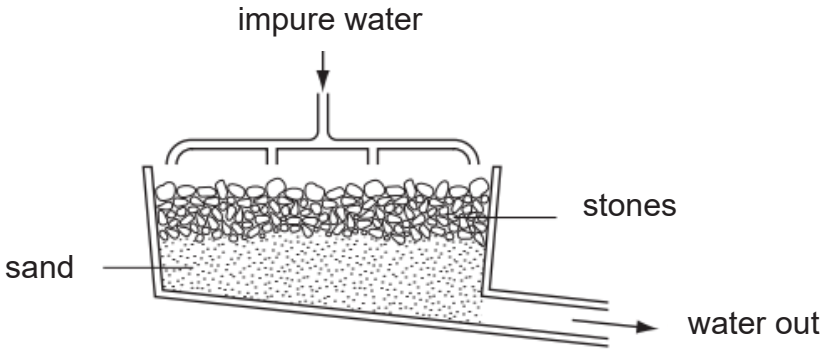
(c) Comparing protons, electrons, and neutrons, which subatomic particles have the lowest mass?

…… [1]

(d) Draw the electronic configuration of atom **R** in the box below.

[2]

3 (a) Drinking water can be obtained from treatment of used muddy water.
The figure below shows a filter tank used in the first stage of the purification process.



(i) Explain how the filter is used to purify water.

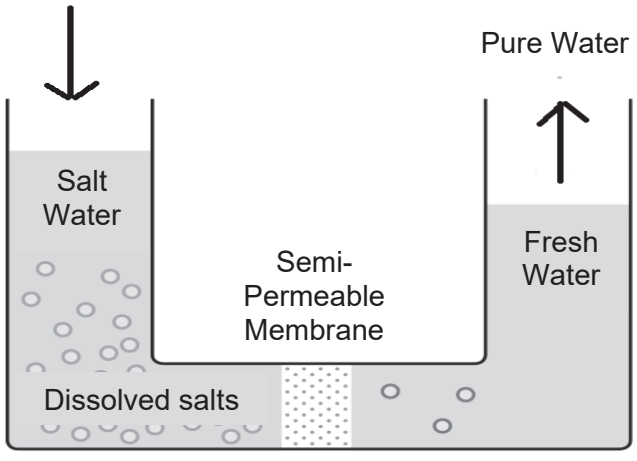
……

…… [2]

(ii) Suggest one improvement that can be made to the design of the filter tank so as to improve the quality of filtration.

…… [1]

(b) After passing through the filter tank, the filtrate may be subjected to reverse osmosis and microfiltration. The figure below shows the process of reverse osmosis.



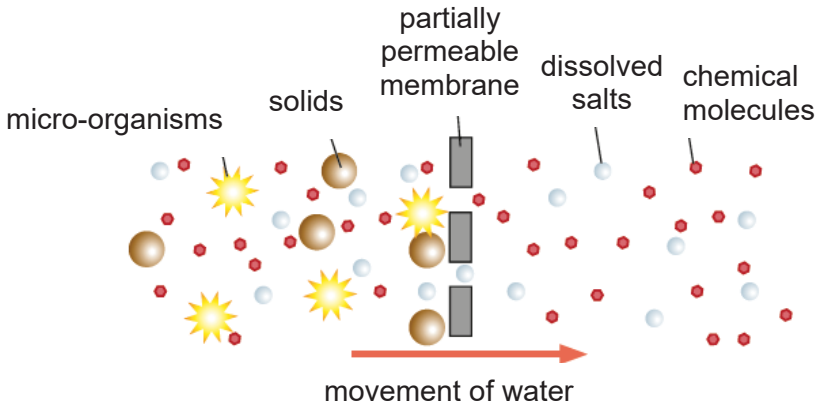
(i) State what happens to the amount of dissolved salts as it passed through the semi-permeable membrane.

…… [1]

(ii) State the function of reverse osmosis.

…… [1]

(iii) The figure below shows the partially permeable membrane used in the process of microfiltration.

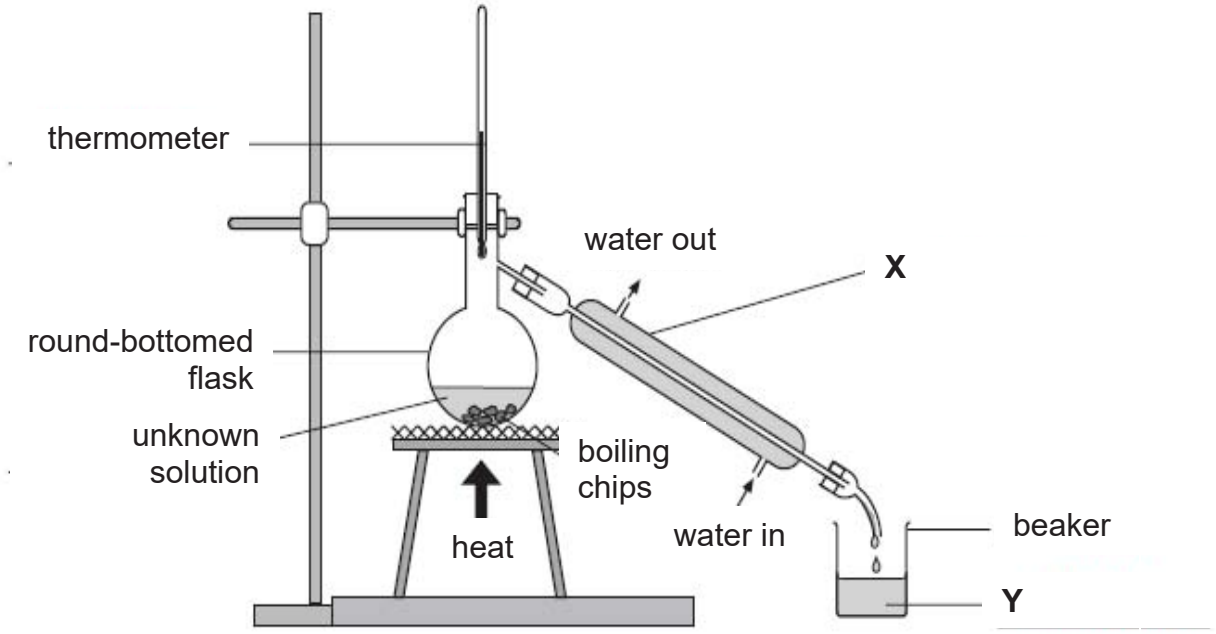


Explain why only chemical molecules and dissolved salts are able to pass through the partially permeable membrane.

.....

…… [2]

4 The following apparatus was set up to separate the contents of an unknown solution.



(a) State the separation technique above.

…….. [1]

(b) Identify apparatus **X** and liquid **Y**.

X: ……..

Y: …….. [2]

(c) State the function of boiling chips.

…….. [1]

(d) During the process of separation, the thermometer indicated a temperature of 100°C. Suggest the identity of the solvent and justify your answer.

……..

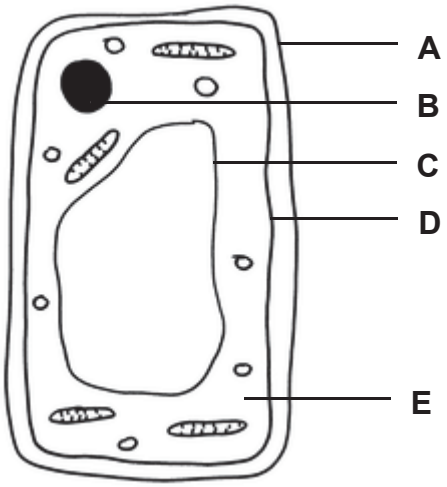
…….. [2]

(e) Coca Cola is a concentrated sugar solution. Predict what would happen if the unknown solution is replaced with Coca Cola. Explain your answer.

……..

…….. [2]

5 To observe onion cells, a student peeled off the epidermis of an onion and placed under a microscope. He then drew his observations in the form of a cell model and labelled its parts as **A**, **B**, **C**, **D** and **E**.



(a) Name the parts labelled **A**, **B**, **C**, **D,** and **E**.

A: ……..

B: ……..

C: ……..

D: ……..

E: …….. [5]

(b) **(i)** State the function of the part labelled **D** of the cell.

…….. [1]
.

(ii) State the property of part **D** that allows it to perform its function.

……. [1]

(c) Part **B** contains materials that control heredity. Identify the materials in part **B**.

…….. [1]

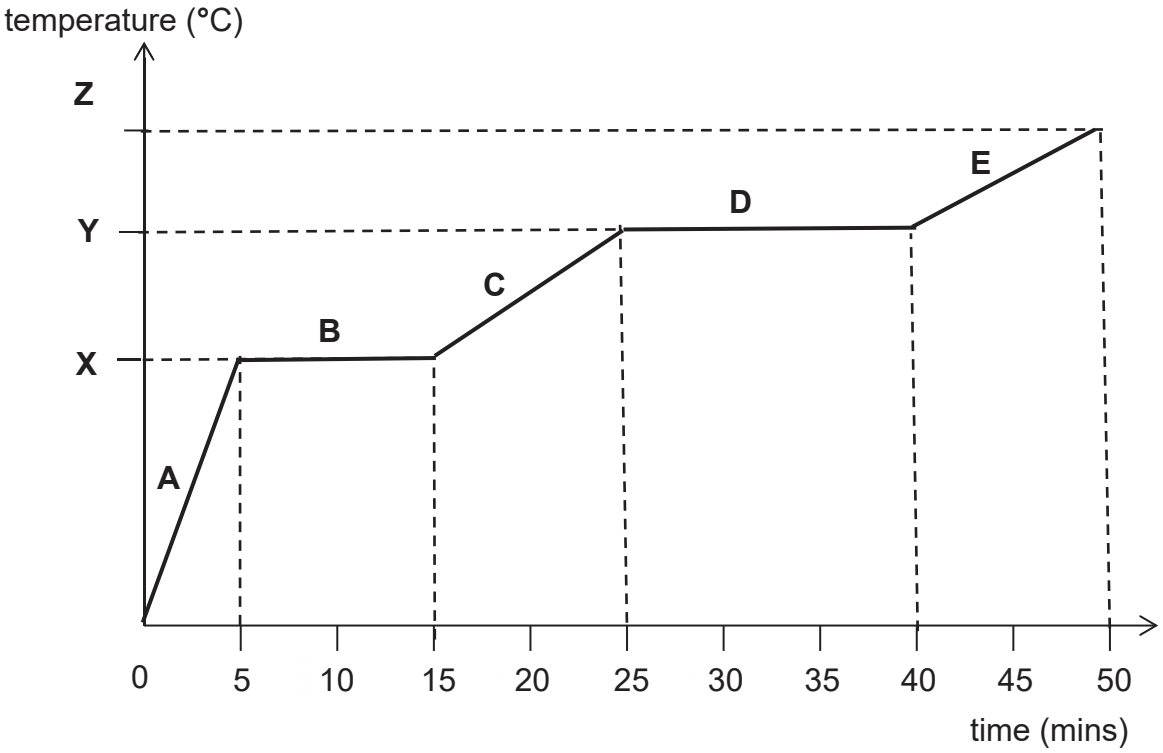
(d) Predict what would happen to the cell of the onion epidermis if part **A** was removed.

…….. [1]

Section C: Long Structured Questions (30 marks)
Answer **all** the questions and show all workings clearly in the spaces provided.

1 Sodium chloride, also known as table salt, is a compound with a melting point of 801 °C and a boiling point of 1465 °C. It is found in large quantities in seawater.

In an experiment, solid sodium chloride is heated strongly to a maximum temperature of 1500 °C. The solid first melted and turns into a liquid before vaporising. The heating curve of the experiment is documented in the diagram below.



(a) **(i)** Name the physical states of the substance in the regions **B** and **C**.

B: .....

C: ..... [2]

(ii) State the values of **X** and **Y**.

X: .....

Y: ..... [2]

(b) Using the Kinetic Particulate Theory of matter, describe the arrangement and movement of particles in region **E**.

……

…… [2]

(c) State and explain what happens to the state of sodium chloride as the heating curve remains constant in region **D**.

……

…… [2]

(d) The picture below shows a technique of how sodium chloride is obtained from sea water.

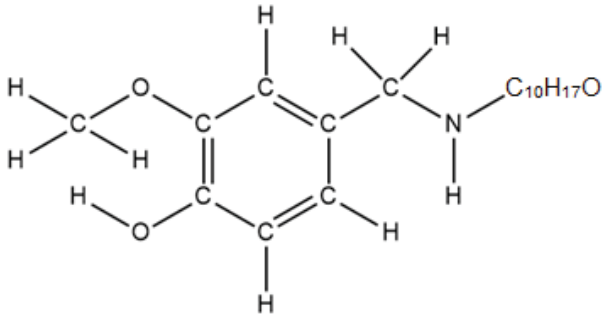
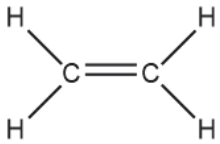
(i) Name the technique.

…… [1]

(ii) State the residue that remains after the process is performed.

…… [1]

2 The table below shows some information of substances commonly used in food. Use the information to answer the questions that follow.

substance	uses and explanation
baking powder	Baking powder contains sodium hydrogen carbonate ($NaHCO_3$). Upon heating, it decomposes to form solid sodium carbonate (Na_2CO_3), water vapour and carbon dioxide. Baking powder is added in bread and cake dough as the carbon dioxide produced will create holes in the dough, making it expand and fluffy.
capsaicin	Capsaicin is the substance in chilli pepper that causes the burning sensation on the tongue. The nerve receptors on the tongue can detect very small amount of capsaicin. Capsaicin is insoluble in water but is soluble in milk and vegetable oil. The structure of capsaicin is shown below. 
ethene	Bananas turn brown after some time as it contains a hormone that triggers the release of ethene gas. Ethene gas speeds up the ripening process. The structure of ethene is shown below. 

(a) Using the Periodic Table, name all the elements present in baking powder.

…… [2]

(b) Write down the chemical formulae for water vapour and carbon dioxide.

water vapour : ……

carbon dioxide : …… [2]

(c) State the number of types of elements and the total number of atoms present in one molecule of ethene.

number of types of elements : ……..

total number of atoms : ……... [2]

(d) A hydrocarbon is a compound which contains hydrogen and carbon only.

State the chemical formula of Capsaicin and explain whether it is a hydrocarbon or not.

…….

……. [2]

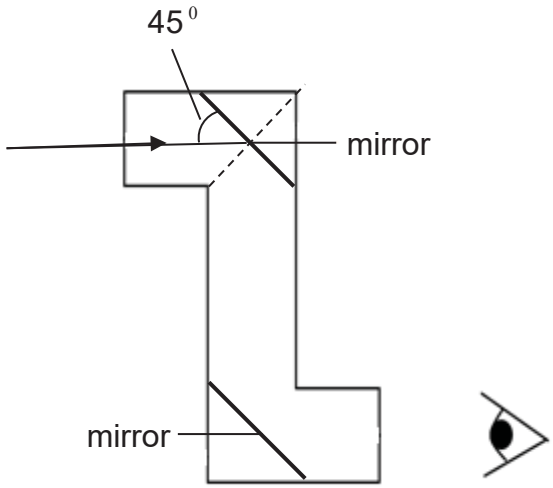
(e) After eating a bowl of spicy curry made from chilli peppers, a student drank water to relieve the burning sensation but it did not help.

Explain why water does not help to relieve the burn caused by capsaicin and suggest a method that will help to relieve the burning sensation.

…….

……. [2]

3 (a) A periscope is an instrument for making observations over, around or through an object, obstacle. It is constructed using two inclined plane mirrors.



(i) State the angle of reflection.

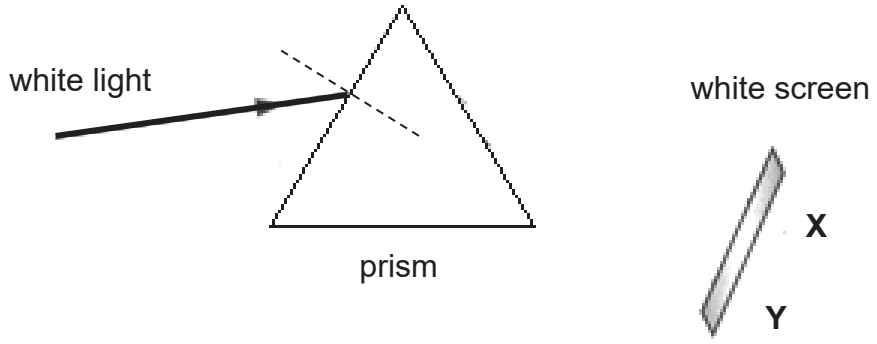
…… [1]

(ii) By indicating the normal and labelling the incident and reflected ray, complete the following diagram by drawing the path of a light ray in the periscope. [2]

(iii) Would the image formed in the two mirrors appear bigger, smaller, or the same size?

…… [1]

(b) A spectrum of seven colours is dispersed when a white light travels through a prism. The colours emerge out of the prism and is captured on a white screen. The extreme ends of the spectrum are marked **X** and **Y**,



(i) By drawing two rays of light splitting from the white light as it enters the prism and finally ending at points **X** and **Y**, complete the ray diagram. Indicate and label the normal. [3]

(ii) Describe what happens to the speed of white light as it enters the prism.

…….. [1]

(iii) Identify colours at **X** and **Y**.

X is ……. [1]

Y is ……. [1]

-END OF BOOKLET B-

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9		Key proton (atomic) number atomic symbol name relative atomic mass									5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium -	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57 – 71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89 – 103 actinoids	104 Rf Rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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

ASSUMPTION ENGLISH SCHOOL

Sec 1E EYE Science 2019

Marking Scheme

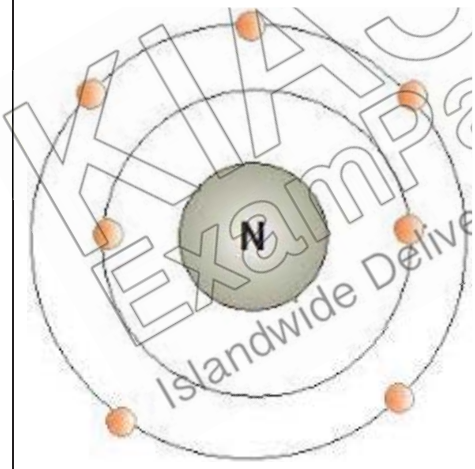
Section A

Answers

1	2	3	4	5	6	7	8	9	10
C	C	D	C	C	B	C	B	B	B
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C	C	C	C	A	C	D	D	A	C
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	A	D	B	A	B	A	C	D	D

Section B

Qn	Solution	Marks	Remarks
1ai	Mass of ball	B1	
1aii	Time taken to reach ground	B1	
1aiii	Height it is dropped from/ material of the ball etc.	B1	Any relevant answer
1b	Mass of ball does not affect how fast it falls from a height.	B1	
1c	<table><tr><th>Equipment</th><th>Measured Variable</th></tr><tr><td>electronic balance</td><td>mass</td></tr><tr><td>Stopwatch</td><td>time</td></tr></table>	B2	Accept Measure height dropped using a metre rule.

<table>
<tr><td>2a</td><td>
<table>
<tr><th>atom</th><th>P</th><th>Q</th><th>R</th><th>S</th><th>T</th><th>U</th></tr>
<tr><td>atomic number</td><td>1</td><td>3</td><td>7</td><td>9</td><td>13</td><td>18</td></tr>
<tr><td>mass number</td><td>1</td><td>7</td><td>15</td><td>19</td><td>27</td><td>40</td></tr>
<tr><td>No. of electrons</td><td>1</td><td>3</td><td>7</td><td>9</td><td>13</td><td>18</td></tr>
<tr><td>No. of neutrons</td><td>0</td><td>4</td><td>8</td><td>10</td><td>14</td><td>22</td></tr>
</table>
3 marks for all correct answers
2 marks for at least 4 correct answers
1 mark for at least 2 correct answers
</td></tr>
<tr><td>2bi</td><td>U</td><td>B1</td><td></td></tr>
<tr><td>2bii</td><td>T and Q</td><td>B1</td><td></td></tr>
<tr><td>2biii</td><td>S</td><td>B1</td><td></td></tr>
<tr><td>2biv</td><td>P</td><td>B1</td><td></td></tr>
<tr><td>2c</td><td>electrons</td><td>B1</td><td></td></tr>
<tr><td>2d</td><td> 
</td><td>B2</td><td>1 mark for 1st shell of valence electrons

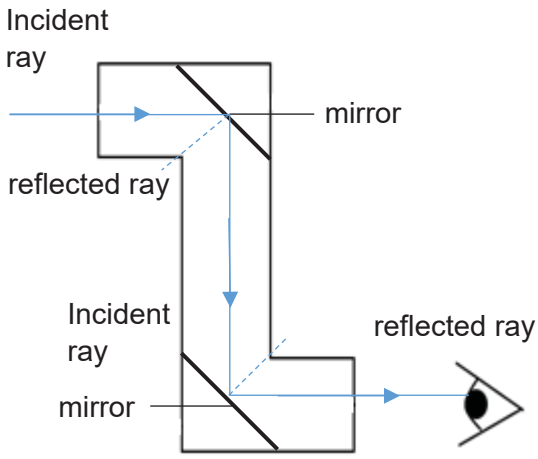
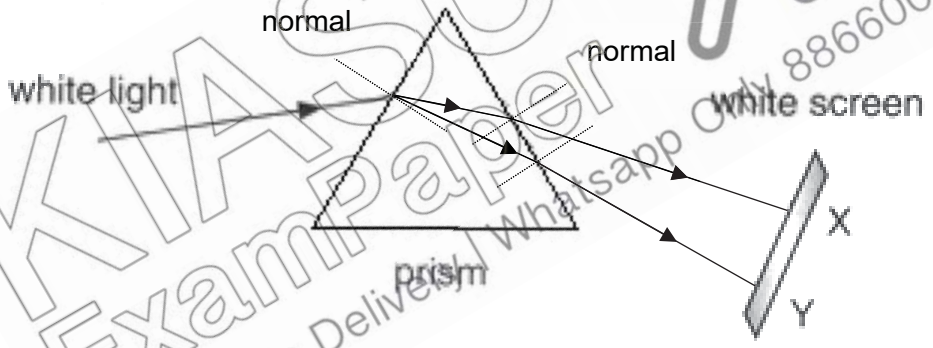
1 mark for second shell of valence electrons</td></tr>
<tr><td>3ai</td><td>The filter does not allow particles larger than the spaces in between stone and sand to pass through, leaving the impurities as residue and water as filtrate.</td><td>B2</td><td>1 mark for “does not allow particles larger than the spaces/ trapped”

1 mark for “residue…filtrate”</td></tr>
</table>

3aii	Use of extra layer of activated carbon	B1	Any other relevant answer pertaining to extra layers
3bi	Lesser dissolved salts passed through partially permeable membrane	B1	
3bii	To remove dissolved salts from water	B1	
3biii	The membrane acts as a filter. Dissolved salts and chemical molecules are small enough to pass through the tiny pores of the filter.	B2	1 mark for “small enough”, 1 mark for “tiny pores”.
4a	Distillation	B1	
4b	**X**: Condenser **Y**: Distillate	B2	1 mark each
4c	To allow the boiling process to occur more smoothly.	B1	
4d	The solvent is water because water boils at 100 degrees Celsius.	B2	1 mark for “water” 1 mark for “water boils at 100 degrees Celsius”
4e	A black solid would be formed in the round bottom flask because the sugar in Coca Cola decomposes with heating.	B2	1 mark for “black solid” 1 mark for “sugar decomposes..”
5a	A: cell wall B: nucleus C: vacuole D: cell membrane E: cytoplasm	B5	1 mark each
5bi	To allow selected particles to move in and out of the cell.	B1	
5bii	Semi-permeable	B1	
5c	Chromosomes	B1	
5d	The cell would lose its shape.	B1	

Section C

Qn	Solution	Marks	Remarks
1ai	B: Solid-liquid C: Liquid	B2	1 mark each
1aii	X: 801 Y: 1465	B2	1 mark each
1b	Particles of gases are arranged randomly at distances far apart, moving freely at high speeds	B2	1 mark for arrangement 1 mark for movement
1c	In region D, particles gain heat energy to overcome forces of attraction instead of raising the temperature.	B2	1 mark for "overcome forces of attraction" 1 mark for "instead of raising the temperature"
1di	Evaporation	B1	
1dii	Sodium chloride/ salt	B1	
2a	Sodium, hydrogen, carbon and oxygen	B2	2 mark for all correct elements 1 mark for at least 2 correct elements
2b	Water vapour: H_2O Carbon dioxide: CO_2	B2	1 mark each
2c	Number of types of elements: 2 Total number of atoms: 6	B2	
2d	$C_{18}H_{27}NO_3$. Not a hydrocarbon.	B2	1 mark each
2e	This is because capsaicin is insoluble in water. To relieve the burning sensation, use milk instead.	B2	1 mark each

3ai	45°	B1	
3aii		B2	1 mark for correct path of light with arrows 1 mark for normal and labels of incident and reflected rays
3aii	It would appear the same size because the mirrors used are plane mirrors.	B1	
3bi			
		B3	2 marks for correct path of rays 1 mark for labelled normal
3bii	Light decreases in speed.	B1	
3biii	X is red. Y is violet.	B2	1 mark each