

Name: _____

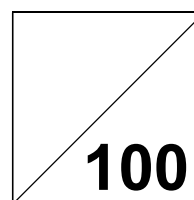
Class

Index Number



Jurong West Secondary School

End-of-Year Examinations 2024



G3
(EXP)

LOWER SECONDARY SCIENCE

Secondary One G3 (EXP)

Wednesday
25 September 2024
0800 - 0945
1 hour 45 minutes

Additional material: Multiple Choice Answer Sheet.

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs, tables or rough working.

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

The use of an approved scientific calculator is expected, where appropriate.

You may lose marks if you do not show your working or if you do not use appropriate units.

Section A

There are **thirty** questions. 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 the **multiple choice answer sheet provided**.

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 question paper.

Section B

Answer **all** questions in the spaces provided. The number of marks is given in brackets [] at the end of each question or part question.

Section C

Answer **one** question in this section in the spaces provided.

A copy of the Periodic Table is printed on page 31.

After checking of answer script		
Checked by	Signature	Date
Student		

There are a total of **31** printed pages (including the cover page)

Section A: Multiple Choice (30 marks)

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 the multiple choice answer sheet.

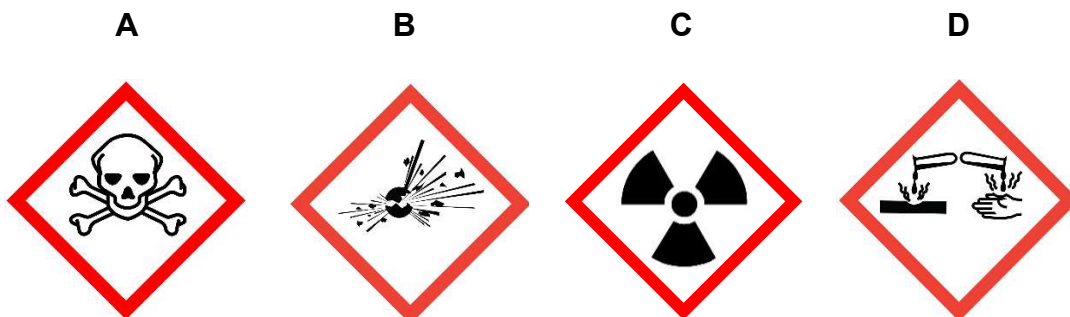
- A1** Thomas observed that in the month of November and December, the number of days it rained were 19 and 17 days per month respectively. He hypothesised that November was the month where it rained the most in a year. Thomas then recorded the number of rainy days in a month until the next November.

Why did Thomas record the number of rainy days in a month until the next November?

- A** He wanted to ask a question.
- B** He wanted to draw a conclusion.
- C** He wanted to explain the high rainfall in August.
- D** He wanted to form a hypothesis.

- A2** Concentrated sulfuric acid is a corrosive substance.

Which hazard symbol should be labelled on a container of concentrated sulfuric acid?

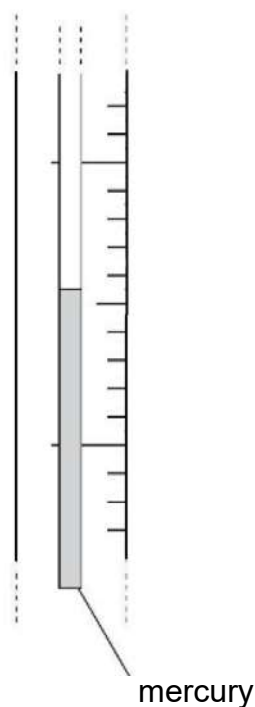


- A3** Which is **not** an SI unit?

- A** g
- B** K
- C** m³
- D** s

- A4** The boiling point of liquid **P** is lower than that of water. The student places a thermometer in boiling liquid **P**.

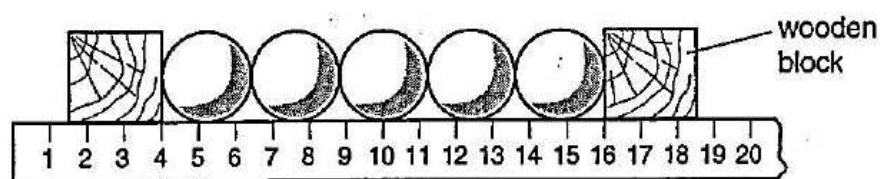
The diagram below shows part of the stem of this thermometer without numbers.



What is the boiling point of liquid **P**?

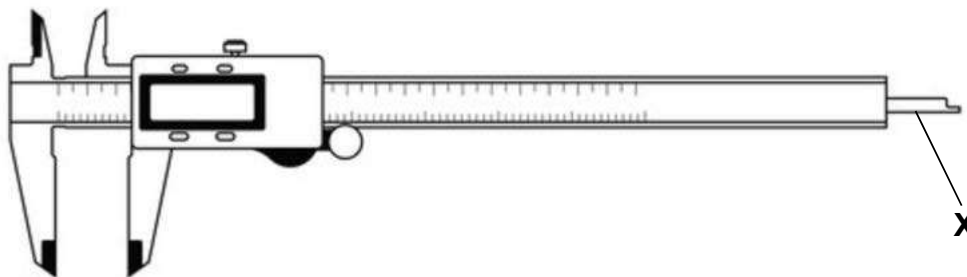
- A** 85.5 °C
- B** 94.5 °C
- C** 100.0 °C
- D** 105.5 °C

- A5** Five identical metal spheres are measured, in centimetres, as shown in the diagram using a ruler.



- What is the radius of each metal sphere?
- A** 1.2 cm
 - B** 1.6 cm
 - C** 2.4 cm
 - D** 3.2 cm
- A6** Plastic screen protectors for mobile devices can be scratched easily. Tempered glass screen protectors are less easily scratched.
- Which physical property of a material will prevent it from being scratched easily?
- A** conductivity
 - B** flexibility
 - C** hardness
 - D** strength
- A7** An object has a high melting point. It is a poor conductor of heat and is hard but fragile. What material could this object be made of?
- A** ceramic
 - B** fibre
 - C** metal
 - D** plastic

A8 What is the function of the part labelled **X**?

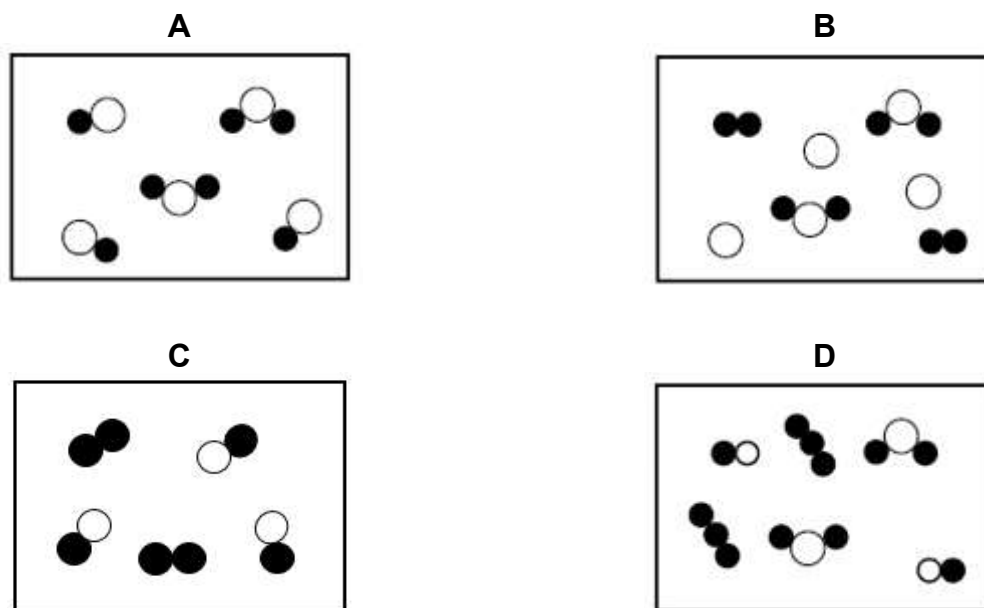


- A** to cut food sample for measurement
- B** to help balance the digital calipers
- C** to mark out the outline of an object for measurement
- D** to measure the depth of a small test tube

A9 Which statement about the Periodic Table is correct?

- A** Elements in the same group have similar physical properties.
- B** Elements in the same group must be all metals, or all non-metals.
- C** The Periodic Table does not show any compound or mixture.
- D** The properties of elements change from non-metallic to metallic across each horizontal row.

A10 Which diagram represents a mixture of an element and two compounds?



A11 Thomas added a teaspoon of sugar and salt to a small beaker containing water and then stirred it. What is formed?

- A** A solution containing one solute and two solvents.
- B** A solution containing one solvent and two solutes.
- C** Sugar and salt will react with each other in water and form a suspension.
- D** Sugar, salt and water will react and form a compound.

A12 Which statements correctly describe a suspension?

1. A suspension can be separated by filtration.
2. A suspension allows light to pass through it fully.
3. Insoluble substances can be seen in a suspension.

- A** 1 and 2 only
- B** 1 and 3 only
- C** 2 and 3 only
- D** 1, 2 and 3

A13 The table below shows the colours of four solids and their solubilities in water.

solid	colour	solubility in water
W	green	insoluble
X	green	soluble
Y	brown	insoluble
Z	brown	soluble

A mixture containing two of the solids is added to excess water, stirred and filtered. A green filtrate and a brown residue are obtained.

Which two solids are present in the mixture?

- A** W and X
- B** W and Y
- C** X and Y
- D** X and Z

A14 Which mixture **cannot** be separated by magnetic attraction?

- A** cobalt and copper
- B** gold and nickel
- C** iron and cobalt
- D** sulfur and steel

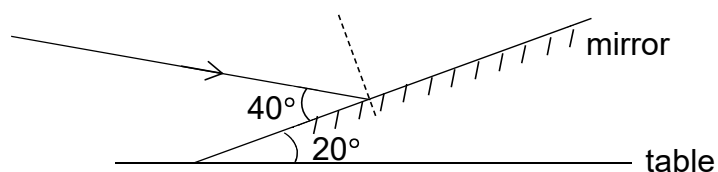
A15 Which substance can be obtained from a solution by evaporation to dryness?

- A** individual food colouring
- B** pure water
- C** sugar
- D** table salt

- A16** In 2003, Singapore launched our very own NEWater. To produce NEWater, sewage or used water must undergo two separation techniques in succession before clean drinkable water is obtained.

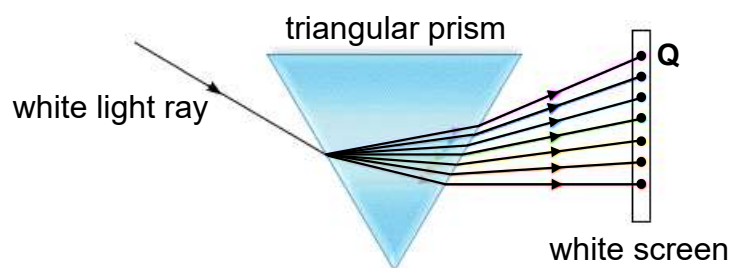
Which two separation techniques are used to produce drinkable water from sewage or used water?

- A** magnetic separation and chromatography
 - B** microfiltration and reverse osmosis
 - C** microfiltration and simple distillation
 - D** simple distillation and chromatography
- A17** What is the angle of reflection for the ray of light below? The diagram is not drawn to scale.



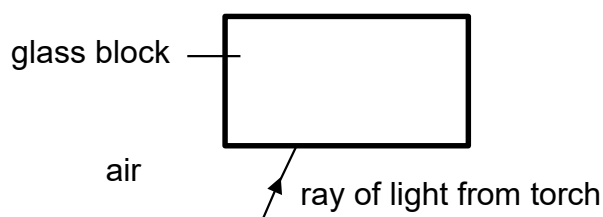
- A** 20°
- B** 40°
- C** 50°
- D** 60°

- A18** The diagram below shows how white light behaves after it passes through a triangular prism.

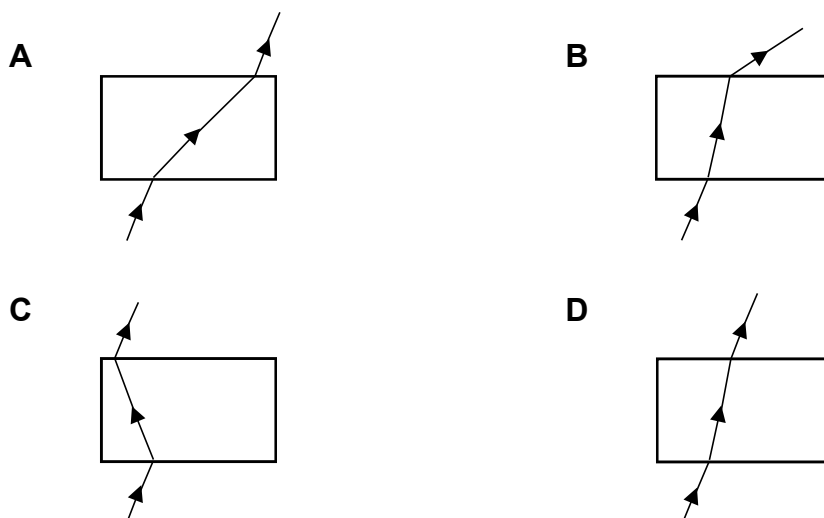


What is the colour formed on the white screen indicated by **Q**?

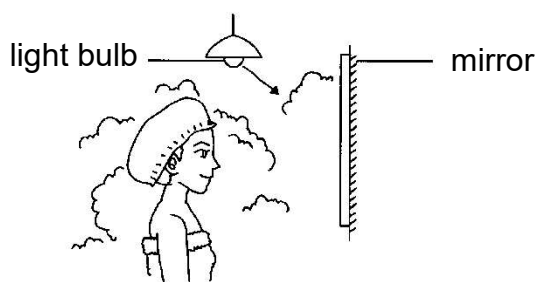
- A** green
 - B** red
 - C** violet
 - D** white
- A19** Aliff shines a torch onto a rectangular glass block, as shown in the diagram below.



Which diagram below shows how the ray of light from the torch travels through the glass block?



- A20** Claire looks at the light bulb in the bathroom mirror. Water vapour from the hot bath has condensed on the mirror to form water droplets.



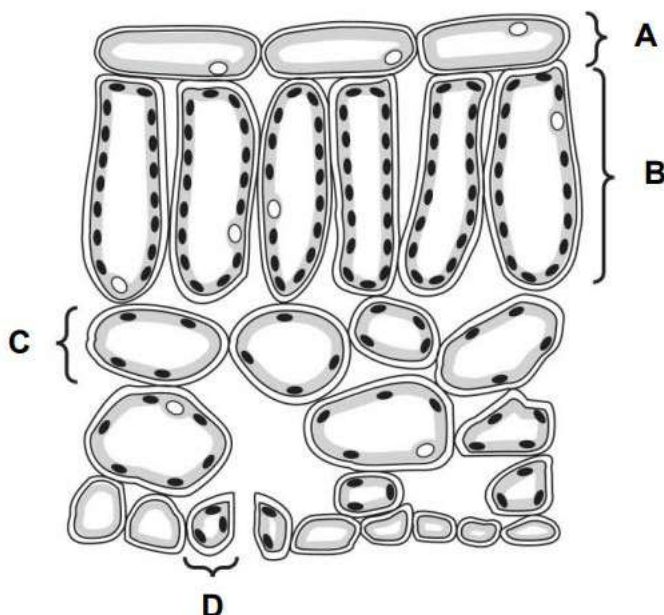
She sees a distorted image of the light bulb.

Which statement explains what Claire sees?

- A** The light rays are absorbed by the water droplets.
 - B** The light rays reflect at different angles due to the water droplets.
 - C** There is regular reflection of light by the water droplets.
 - D** There is regular refraction of light by the mirror.
- A21** Why is the heart considered an organ?
- A** It consists of a group of heart muscle cells contracting and relaxing rhythmically.
 - B** It consists of different tissues working together to pump blood to other parts of the body.
 - C** It is the basic unit that keeps a human alive.
 - D** It works with other organ systems to ensure the body gets sufficient blood.

A22 The diagram below shows the cross-section of a leaf.

Which part does most photosynthesis take place?



A23 Which is an example of division of labour within a single cell?

1. Chloroplasts contain chlorophyll to make food.
2. The heart and blood vessels form a network to transport blood around the body.
3. The mouth, stomach and small intestine work together to digest food.
4. The nucleus contains genetic material for cell division.

- A** 1 and 4 only
B 2 and 3 only
C all of the above
D none of the above

A24 Which statement about matter is true?

- A** Gas particles are the most numerous compared to solids or liquids per unit volume.
B Matter has mass and occupies space.
C Particles in a liquid are held together by weak forces of attraction.
D When a solid is heated, its particles increase in size.

A25 During cooling, what happens to a substance?

- A** Density remains unchanged.
- B** Mass changes.
- C** Volume and mass change.
- D** Volume changes.

A26 A sealed conical flask contains a substance in solid, liquid and gaseous states.

Which statement is correct?

- A** A gas particle has a lower mass than a liquid particle.
- B** Liquid particles move much slower than those in solids.
- C** Liquid particles vibrate about their fixed positions.
- D** Solids have stronger forces of attraction between particles than those in liquids.

A27 Sodium chromate is a substance used in the production of inks and dyes, and also in laboratories for various chemical tests and experiments. It has a chemical formula of Na_2CrO_4 .

How many different elements can be found in sodium chromate?

- A** 3
- B** 6
- C** 7
- D** 9

A28 Which statement is correct about a molecule of a compound?

- A** A fixed number of different types of atoms but not chemically combined
- B** a fixed number of different types of atoms chemically combined
- C** any number of different types of atoms but not chemically combined
- D** any number of different types of atoms chemically combined

A29 Which pair of elements has the same number of occupied electron shells?

- A** lithium and oxygen
- B** lithium and sodium
- C** oxygen and sulfur
- D** sulfur and germanium

A30 Which statement is **false** about atoms?

- A** All matter is made up of atoms.
- B** Atoms can have zero neutrons.
- C** The nucleus of an atom is positively charged.
- D** The protons move around the nucleus.

Section B (60 marks)

Answer all the questions in the spaces provided.

- B1** An experiment requires a warm sample of alcohol, which is flammable. To heat up the sample, a student sets up the apparatus and equipment as shown in Fig. 1.1.

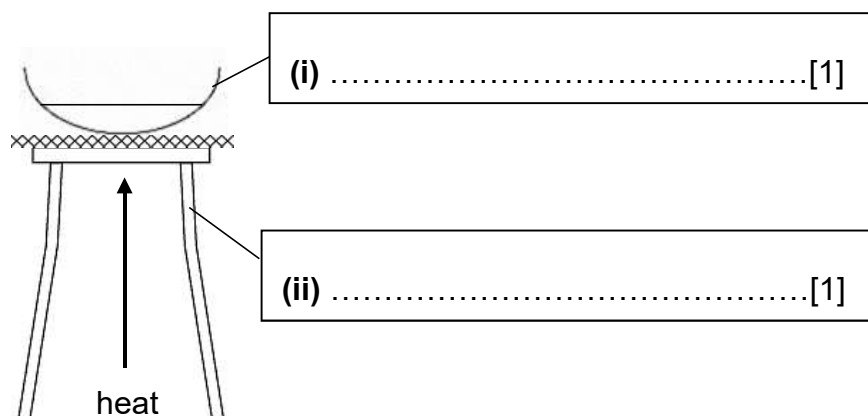


Fig. 1.1

- (a) Name the apparatus labelled (i) and (ii) in the diagram above.
- (b) The teacher pointed out a serious mistake she has made in the setup.
- Describe the mistake and explain the potential danger of this mistake.
-
-[2]
- (c) A Bunsen burner was used to supply the heat in the set-up. The air hole was closed initially. Upon ignition, a flame forms from Part **H** of the Bunsen burner, as shown in Fig. 1.2.

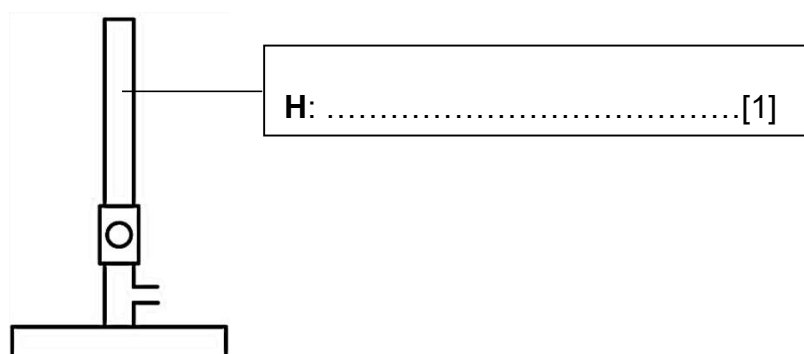


Fig. 1.2

- (i) Name part **H** in Fig. 1.2.

- (ii) The student wishes to use a flame for strong heating of chemicals.

Describe what she should do to the Bunsen burner to achieve a hotter flame.

.....
[1]

- B2** Haziq carried out an experiment to find out the amount of water that four different materials, **J**, **K**, **L** and **M** can absorb. He placed each material over a beaker and poured 50 ml of water onto the material one at a time. Fig. 2.1 shows the setup.

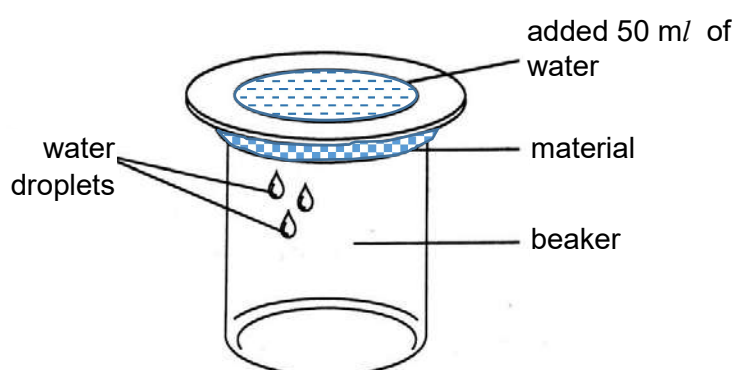


Fig. 2.1

He then recorded the volume of water left in the beaker using a measuring cylinder, after each material was tested in Table 2.2.

Table 2.2

type of material	volume of water left in beaker (ml)
J	21
K	14
L	33
M	8

- (a) Identify the variables for the experiment.

Independent variable:[1]

Dependent variable:[1]

Constant variable:[1]

(b) What is the purpose of keeping some variables constant in an experiment?
[1]

(c) With reference to the results in Table 2.2, explain which is the **best** material for making a bath towel.

[2]

B3 Table 3.1 shows the composition of some main components of clean air, which is a mixture.

Table 3.1

substance	percentage composition	element or compound?
nitrogen	78%	
oxygen	21%	
water vapour	0 – 3%	
other gases	0.97%	not applicable

(a) Complete the third column in Table 3.1 by classifying the different substances as an element or a compound. [2]

(b) Define the term 'mixture'.

[1]

(c) State two differences in properties between a mixture and a compound.

Difference 1:

.....

Difference 2:

.....
[2]

- B4** A piece of copper metal was melted down together with a piece of zinc metal. Both were simply poured together and allowed to solidify to form brass.

Table 4.1 shows some known quantities of the two metals used.

Table 4.1

metal	$\frac{\text{mass}}{\text{g}}$	$\frac{\text{volume}}{\text{cm}^3}$	$\frac{\text{density}}{\text{g / cm}^3}$
copper	300	?	8.96
zinc	?	20	7.14

- (a) Suggest the apparatus used to measure the volume of the two metals, using the volume displacement method.

.....[1]

- (b) Calculate the volume of copper. [1]

- (c) Calculate the mass of zinc. [1]

- (d) Muthu cut the solidified brass into two equal halves. Describe what happens to the density of each of the halves.

.....[1]

- (e) Shania and Huiting each took the 300 g copper and weighed it several times using an electronic balance. Their results are shown in Table 4.2.

Table 4.2

	Mass / g			
	reading 1	reading 2	reading 3	average
Shania	299.5	300.2	299.7	299.8
Huiting	301.4	301.5	301.4	301.4

- (i) Whose results are more accurate? Explain your answer.

.....
[2]

- (ii) Whose results are more precise? Explain your answer.

.....
[2]

B5 Table 5.1 shows the melting and boiling points of three substances **P**, **Q** and **R**.

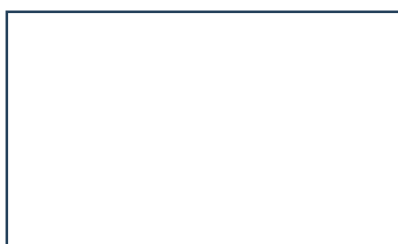
Table 5.1

substance	melting point / °C	boiling point / °C
P	-30	72
Q	138	541
R	-92	-6

- (a) What is the state of substance **P** at 0 °C?

.....[1]

- (b) Draw the arrangement of particles of substance **Q** at 100 °C. [1]



(c) A student carries out an experiment as shown in Fig. 5.2.

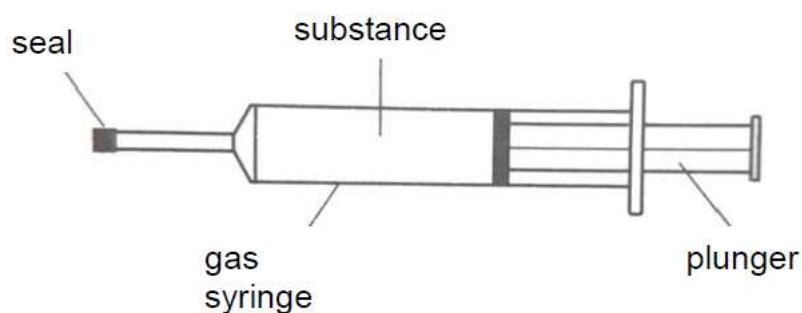


Fig. 5.2

The gas syringe is filled with one of the three substances (**P**, **Q** or **R**) at room temperature. The syringe is sealed as shown above. The plunger is then pushed towards the substance inside the syringe. The initial and final volume of the syringe are shown in Table 5.3.

Table 5.3

initial volume / cm ³	final volume / cm ³
50.0	39.5

State and explain which of the three substances (**P**, **Q** or **R**) is most likely to produce the result shown in Table 5.3.

.....

.....

.....

.....

.....[3]

B6 A bottle of perfume was accidentally overturned and the liquid contents spilled onto the floor of a room. After some time, the smell of perfume spread throughout the entire room.

(a) Describe how the smell of perfume spread throughout the room.

.....
.....
.....[2]

(b) On a warm day, it was observed that the smell of perfume spread more quickly. Based on your understanding of the particulate nature of matter, suggest why this is so.

.....
.....
.....[2]

B7 Fig. 7.1 shows a simplified outline of the Periodic Table with elements indicated by letters.

[illegible]

Fig. 7.1

- (a)** Which of the elements are metals and non-metals?

Metals

Non-metals[2]

- (b)** State the name of one element in the same period as **Q**.

.....[1]

- (c)** Using the Periodic Table of the Elements and the information from Fig. 7.1, write the nuclide notation for atom **Y**.

.....[1]

- B8** Fig. 8.1 shows a root hair cell. A root hair cell absorbs water and mineral salts from the soil.

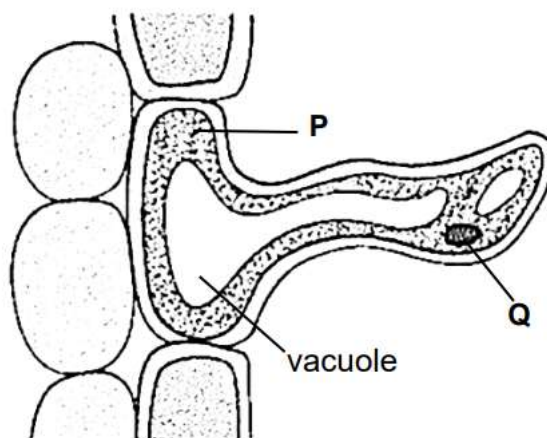


Fig. 8.1

- (a) (i) Name parts **P** and **Q**.

P.....

Q [2]

- (ii) State the function of the vacuole.

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

- (b) Explain why the root hair cell is a plant cell.

.....
.....[2]

- (c) State two differences between the root hair cell and a human cheek cell.

Difference 1:

.....

Difference 2:

.....[2]

B9

The effect of temperature on the solubility of two substances **P** and **Q** in the same volume of solvent was investigated. Fig. 9.1 shows the mass of substance **P** and **Q** dissolved in 100ml of water.

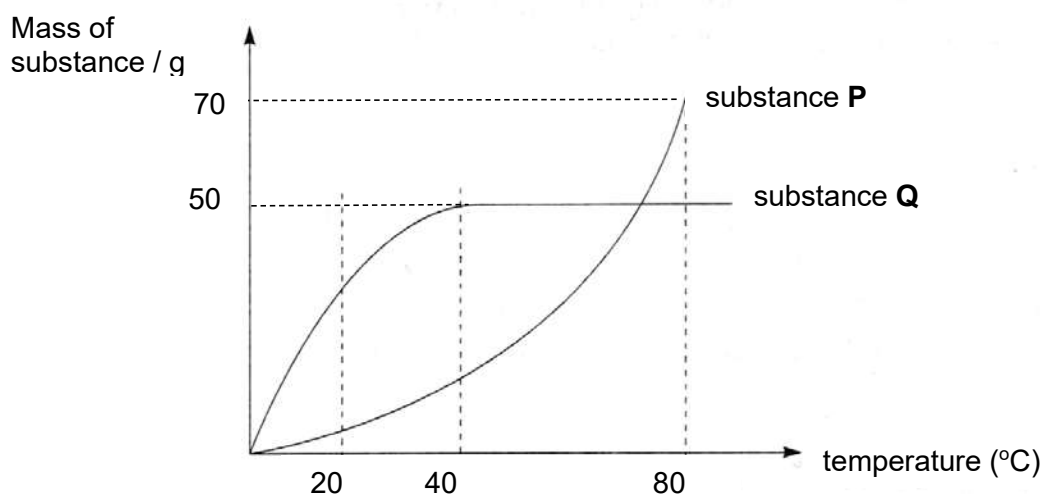


Fig. 9.1

- (a) What can you deduce about the solubility of substance **P** as temperature increases?

.....[1]

- (b) At 80 °C, 60g of substance **P** and **Q** were added to 100 ml of water. Explain whether a solution or suspension is formed for **P** and **Q**.

.....
.....[2]

- (c) Apart from temperature, state one other factor which affect solubility.

.....[1]

B10 Fig. 10.1 shows the position of object, **O**, when placed in front of a plane mirror.

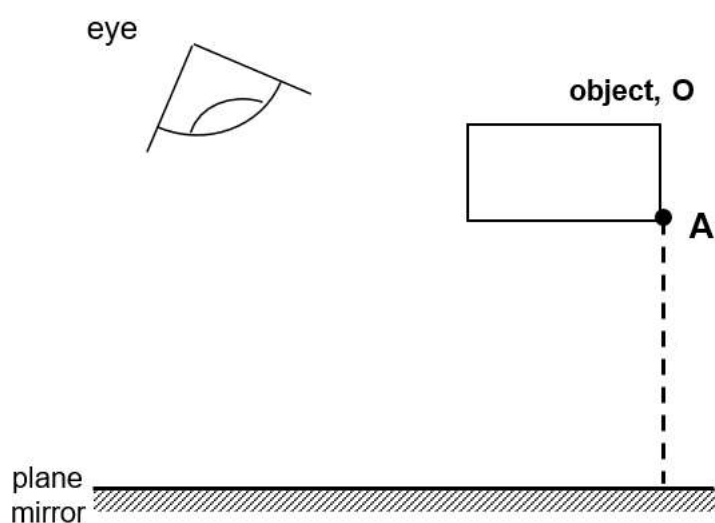


Fig. 10.1 (drawn to scale)

(a) On Fig. 10.1,

- (i)** locate and draw the image of object O. Label the image formed as "I".
[2]
- (ii)** draw one light ray leaving object O from point A to illustrate how the eye sees the image of O in the mirror.
[2]

- (b) Point A on the object, is originally at 11 cm from the mirror. It is then moved 4 cm further away from the mirror.
Describe

- (i) how the distance between point **A** and the image will change.

.....[1]

- (ii) how the height of the image will change.

.....[1]

- B11** Table 11.1 below shows the subatomic particles present in four atoms, J to R.
- Table 11.1**

Atom	number of		
	protons	neutrons	electrons
J	11	12	11
L	9	10	9
M	3	4	3
Q	15	16	15
R	20	20	20

Using the data provided above, answer the following questions.

- (a) Which atom has the smallest nucleon number?

.....[1]

- (b) State the atoms that belong to the same Group?

.....[1]

- (c) State the electronic configuration of atom R.

.....[1]

- (d) Draw the electronic structure of an atom of L in the space below.

[1]

- (e) Explain what is meant by 'atom is electrically neutral'.

.....[1]

Section C (10 marks)

There are two questions in this section. You are required to answer only **one**.
Write your answers in the spaces provided.

- C12** Fig. 12. 1 shows the heating curve of substance **Z** when it is heated for 10 minutes.

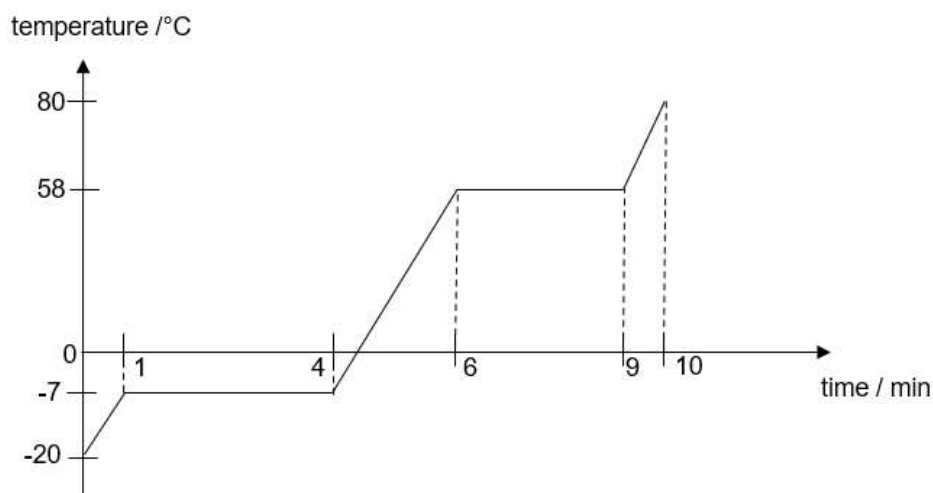


Fig. 12.1

- (a) State kinetic particle theory.

.....

[2]

- (b) Based on the graph, state the melting point and boiling point of substance **Z**.

Melting point

Boiling point [2]

- (c) Describe how the arrangement and movement of particles of substance **Z** change when it is heated from 1 minute to 4 minute.

arrangement:
[2]
 movement:
[2]

- (d) Between 6 to 9 minutes, the density of substance **Z** decreases. Using particulate nature of matter, explain why this happens.

.....

.....

.....[2]

- C13** A student conducted two paper chromatography experiments on a black marker ink using two different solvents, **P** and **Q**.
Fig. 13.1 shows the results of the two experiments.

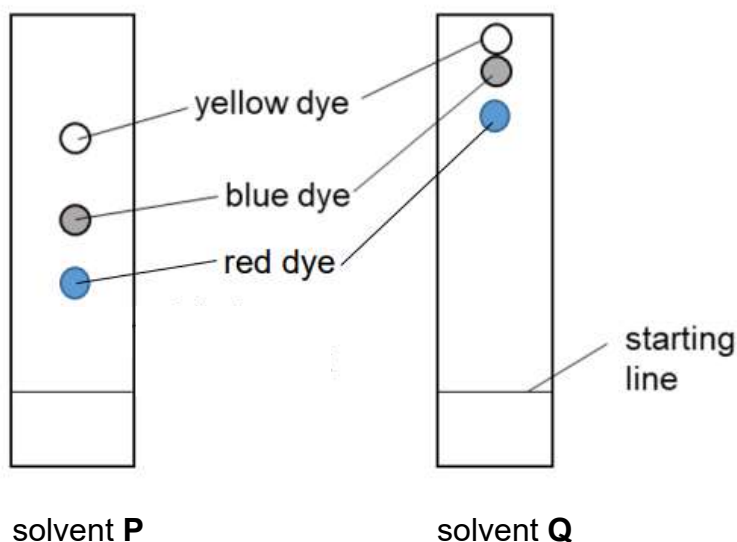


Fig. 13.1

- (a) (i) State one precaution that must be taken when conducting chromatography experiments.
-
-[1]
- (ii) Which dye is most soluble in the two solvents? Explain your answer.
-
-
-[2]
- (iii) Would the red dye travel further in solvent **P** if the experiment is repeated with a longer run time? Explain your answer.
-
-
-[2]

- (b) The experiment is repeated using a mixture of alcohol and water used as the solvent.

The coloured dyes travel different distances on the chromatogram depending on the percentage of alcohol used in the solvent as shown in Fig. 13.2 All other experimental conditions are assumed to be constant.

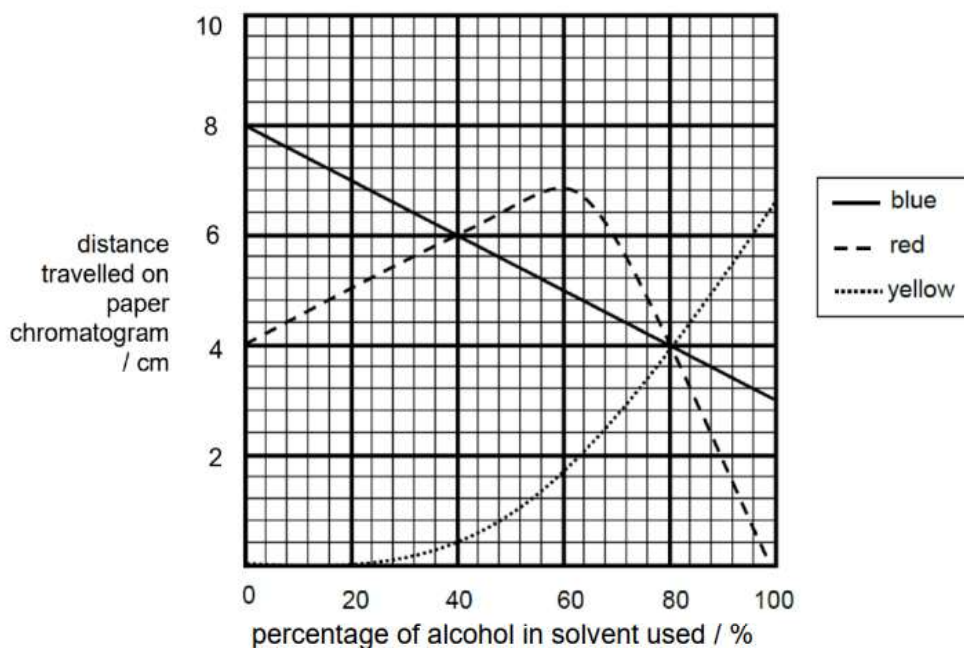


Fig. 13.2

- (i) Determine the distance travelled on the paper chromatogram by the yellow dye when the percentage of alcohol in solvent used is 60%.

.....[1]

- (ii) Using the information provided in Fig. 13.2, state the range of % of alcohol when the red dye is more soluble than the blue dye. Explain how you arrived at your answer.

.....

[2]

- (iii) With reference to Fig. 13.2, explain why a mixture containing 80% of alcohol is **not** suitable as a solvent for this paper chromatography experiment.

.....

[2]

End of Paper

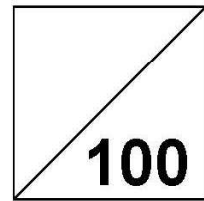
Group

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Name: _____

**Jurong West Secondary School****End-of-Year Examinations 2024**

G3
(EXP)

LOWER SECONDARY
SCIENCE

Secondary One G3 (EXP)

Wednesday

25 September 2024

0800 - 0945

1 hour 45 minutes

Candidates answer on the Question Paper.

MARKING SCHEME / ANSWER KEY

Instructions to Markers (if any)

MARKING SCHEME / ANSWER KEY

Section A

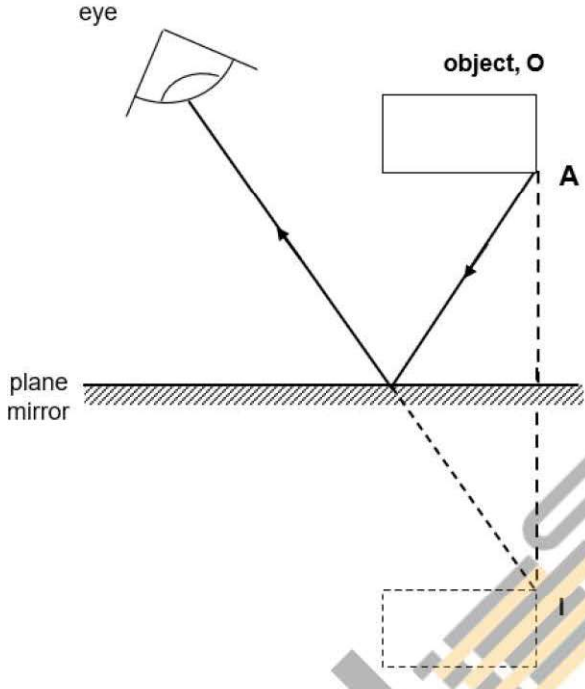
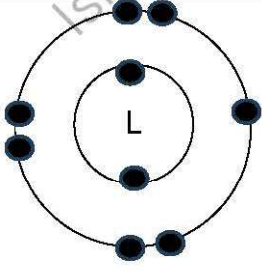
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
B	D	A	A	A	C	A	D	C	D
A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
B	B	C	C	D	B	C	C	D	B
A21	A22	A23	A24	A25	A26	A27	A28	A29	A30
B	B	A	B	D	D	A	B	A	D

Section B

B1	a	i	crucible / evaporating basin / evaporating dish	1
		ii	tripod stand	1
	b	The alcohol is heated directly. Alcohol is flammable, so it might catch fire/burn/ignite when heated directly with a flame. (reject: "explode")		1 1
	c	i	Barrel	1
		ii	Open the air hole.	1
B2	a	Independent variable: type of material		1
		Dependent variable: volume of water collected in the beaker		1
		Constant variable: amount of water poured onto the material (accept: size of material / time taken for water to pass through the material)		1
	b	Some variables are kept constant to ensure a fair experiment.		1
	c	Material M. It is the best absorber of water as the amount of water left in the beaker is the least.		1 1
B3	a	nitrogen: element, oxygen: element, water vapour: compound (All 3 correct: 2 marks; 2 correct: 1 mark; 1 or 0 correct: 0 mark)		2
	b	A mixture consists of two or more different elements or compounds not chemically combined together.		1

	c	- A compound has properties different from its elements but a mixture has the same properties as its components. - A mixture has variable composition by mass but a compound has fixed composition by mass. - A mixture can be easily separated into its components by physical means but a compound can only be separated into its elements by chemical means. - A compound is formed with heat change but a mixture is usually formed without any heat change. (1 mark for a point above. Any 2 points are accepted.)	2
B4	a	Measuring cylinder	1
	b	Volume of copper = $300 \div 8.96$ = 33.5 cm^3 (3 s.f.)	1
	c	Mass of zinc = $20 \times 7.14 = 142.8 \text{ g}$	1
	d	The density will remain the same (or: remain unchanged).	1
	e	i Shania. She had more accurate results as her average reading is closer to the actual mass.	1 1
		ii Huiting. She had more precise results as her readings are closer together. (accept: her readings are very close to one another)	1 1
B5	a	Liquid state.	1
	b	- particles should be about the same size - no overlapping particles - solid state particles of orderly arrangement, very closely packed - start layers of particles from the bottom of the box	1
	c	Substance R . At room temperature, R exists as a <u>gas with large spaces between the particles</u> , and <u>can be compressed, as shown by a significant decrease in volume</u> from 50 cm^3 to 39.5 cm^3 .	1 1 1
B6	(a)	The liquid <u>evaporates</u> . And the smell particles spread throughout the room <u>by diffusion</u> .	1 1
	(b)	(b) At higher temperatures, the particles in perfume have <u>more energy</u> . Hence they are able to move at a higher speed.	1 1

B7	(a)	Metals: Q and Y Non-metals: U, V, X, Z	1 1
	(b)	Elements in Period 3 K, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr [Any 1] Ca is accepted.	1
	(c)	178 72 Y	1
B8	(a)	P cytoplasm	1
	(i)	Q nucleus	1
	(ii)	It stores liquids, food and waste materials. [Any 2]	1
	(b)	Presence of cell wall Presence of large vacuole	1 1
	(c)	The root hair cell has cell wall while the human cheek cell has no cell wall. The root hair cell has a large central vacuole while the human cheek cell has many small vacuoles. The root hair cell has a cell wall/ fixed shape but the human cheek cell does not. The root hair cell has a long narrow protrusion but the human cheek cell does not. [Any 2]	2
B9	(a)	Solubility increases	1
	(b)	P is a <u>solution</u> , Q is a <u>suspension</u> . The <u>maximum mass</u> that substance Q can dissolve is <u>50g</u> .	1 1
	(c)	Nature of Solute / Nature of Solvent	1

B10	(a) (i)	 Correct image - (image same height 1.1cm and same length 2.1 cm) + Label of image with I [1] correct distance (3.5 cm) [1]	2
	(ii)	Correct light ray with arrowhead into the eye and dotted light ray behind the mirror [1] Correct light ray with arrowhead from the object to surface of mirror [1]	1 1
	(b)	The distance between point A and the image is <u>30 cm</u>	1
	(c)	The height of the image will <u>not change</u> . OR The height of the image is the <u>same</u> as the object.	1
B11	(a)	Atom M	1
	(b)	J and M	1
	(c)	2, 8, 8, 2	1
	(d)		1
	(e)	Atoms have the same number of protons, which are positively charged, and electrons, which are negatively charged, hence it is electrically neutral.	1

Section C			
C1	(a)	Matter is <u>made up of</u> (small and discrete) particles That are in <u>constant/continuous random</u> motion	1 1
	(b)	Melting point -7 deg C Boiling point 58 deg C [with units]	1 1
	(c)	The particles that are <u>closely packed and arranged in an orderly manner</u> becomes <u>not so closely packed/closely packed in a disorderly manner.</u> The particles that <u>vibrate about their fixed positions</u> can <u>slide over each other/ move freely</u> throughout the liquid.	1 1 1 1
	(d)	Between 6 to 9 minutes, <u>the particles in substance Z become far apart</u> as it changes state from <u>liquid to gas</u> . The <u>volume of the of substance Z increases</u> , density decreases. OR In a unit volume, there will be lesser number of particles, the <u>mass decreases</u> , density decreases.	1 1
C2	(a)	The starting line on the chromatography paper is drawn in pencil	1
	(i)	or The starting line is always above the solvent level	
	(ii)	Yellow It travelled the longest distance in both solvents.	1 1
	(iii)	No, it will not travel further Solubility does not depend on time.	1 1
	(b)	1.6cm	1
	(i)		
	(ii)	<u>40 to 80%</u> red dye is more soluble than blue dye as it travelled a <u>longer distance</u> than the blue dye at this percentage.	1 1
	(iii)	At 80% of alcohol, all the 3 dyes travelled <u>same</u> distance of <u>4cm</u> Hence, the 3 coloured dye <u>will not be separated</u> .	1 1