

NAME: _____ ()

CLASS: 1 _____



HOUGANG SECONDARY SCHOOL

END-OF-YEAR EXAMINATION / 2024

GENERAL SCIENCE 3

SECONDARY ONE

PAPER 1 MULTIPLE CHOICE

Thursday, 03 Oct 2024

**Total Duration for Paper 1 and 2:
1 hour 45 minutes**

GRATITUDE RESPECT EMPATHY ADAPTABILITY TRUSTWORTHINESS GRATITUDE RESPECT EMPATHY ADAPTABILITY TRUSTWORTHINESS GRATITUDE
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Additional Materials:

Optical Answer Sheet (OAS)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, register number and class on this question paper and on the Answer Sheet (OAS) in the spaces provided.

There are **twenty-five** questions on this paper. 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 pencil** on the OAS provided.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page **12** in this paper.

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

This document consists of **12** printed pages (including this cover page).

[Turn over

- 1 The statements describe the scientific method of demonstrating ways of thinking and doing in science.

- 1 pose questions and define problems
- 2 make observation of a phenomenon
- 3 evaluate and communicate findings
- 4 plan and conduct experiments
- 5 propose a hypothesis

Which order shows the correct sequence of the scientific method?

- A** 1 → 2 → 4 → 5 → 3
B 2 → 1 → 5 → 4 → 3
C 2 → 5 → 1 → 4 → 3
D 4 → 1 → 5 → 2 → 3

- 2 The table shows four investigation topics for a study on eating habits of youths.

	topics
1	investigating the average mass of food consumed.
2	investigating the reasons for the eating habits of youth.
3	investigating the number of meals per day among youths.
4	investigating the types of food usually consumed by youths.

Which pair of investigations will require the collection of qualitative data?

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

- 3 These hazard symbols were found on a bottle of chemical.



What are the potential hazards of using the chemical?

- A** The chemical is carcinogenic and flammable.
B The chemical is carcinogenic and oxidising.
C The chemical is toxic and flammable.
D The chemical is toxic and oxidising.

4 Which unit is an SI unit?

- A cm
- B °C
- C K
- D mm

5 Three students each weighed a 20.0 g mass three times using different electronic balances. Their readings are shown in the table.

student	mass / g			
	reading 1	reading 2	reading 3	average reading
1	19.5	20.4	19.8	19.9
2	23.2	23.1	23.2	23.2
3	20.6	20.0	20.3	20.3

Which student had the most accurate and most precise readings?

	most accurate readings	most precise readings
A	1	2
B	1	3
C	2	1
D	2	3

6 The table shows the scale of hardness of five different materials M, N, O, P and Q.

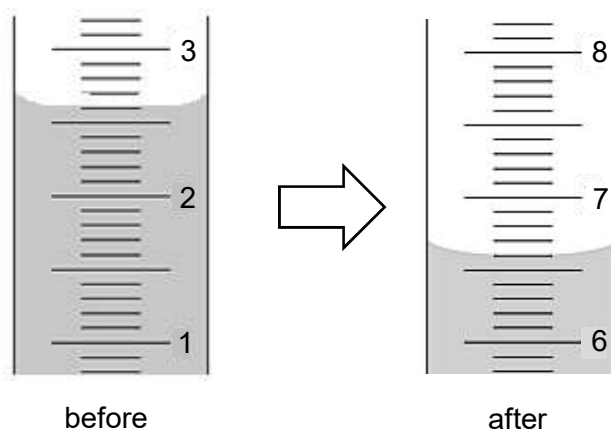
The greater the hardness value, the harder is the material.

material	M	N	O	P	Q
hardness value	7	3	9	2	1

Which statement about these five materials is correct?

- A M can scratch material O and P.
- B N can scratch material P but not O.
- C P can scratch M but not Q.
- D Q can scratch all the other materials shown in the table.

- 7 A student used a measuring cylinder filled with some water to measure the volume of a ring. The diagrams show the readings before and after the ring was placed in the measuring cylinder.



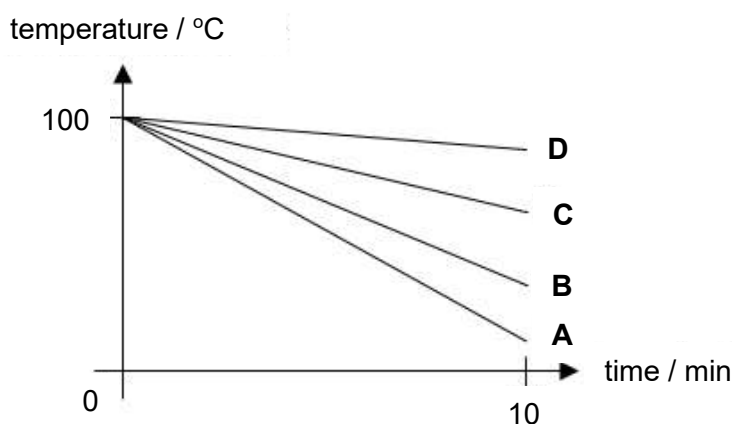
Which row shows the correct measurement of volume?

	initial volume / cm ³	final volume / cm ³	volume of the ring / cm ³
A	2.60	6.60	4.00
B	2.60	6.70	4.10
C	2.70	6.70	4.00
D	3.40	7.40	4.00

- 8 Four identical rods of different materials, **A**, **B**, **C** and **D** were heated to 100 °C.

They were left to cool over a period of ten minutes and their temperatures were recorded in the graph shown.

Which material is most likely used for making a container to keep food warm?



9 Which group of substances contains only non-metallic elements?

- A hydrogen, carbon, sulfur, neon
- B lithium, boron, carbon, fluorine
- C mercury, argon, xenon, fluorine
- D sodium, aluminium, magnesium, lead

10 The table shows some information about three solids, X, Y and Z.

solid	% composition by mass	strongly heated in air
X	fixed	melts
Y	varies	burns
Z	fixed	breaks down into simpler substances

Which statement about these three solids is correct?

- A X and Y are mixtures.
- B X is a compound.
- C Y is an element.
- D Z is a compound.

11 The table shows the chemical formulae of some compounds found in three different metal ores.

name of ore	chemical formula
argentite	Ag_2S
chromite	FeCr_2O_4
galena	PbS

Which statement is **incorrect**?

- A The only ore that contains the least number of different elements is galena.
- B There are at least two ores containing sulfur.
- C There is only one ore that contains three different elements.
- D We can extract iron from only one of the ores.

- 12** An equal amount of sugar is added to equal volume of water under different conditions.

Which set of conditions will cause sugar to dissolve fastest?

	temperature of water / °C	size of sugar
A	20.0	large
B	20.0	small
C	80.0	large
D	80.0	small

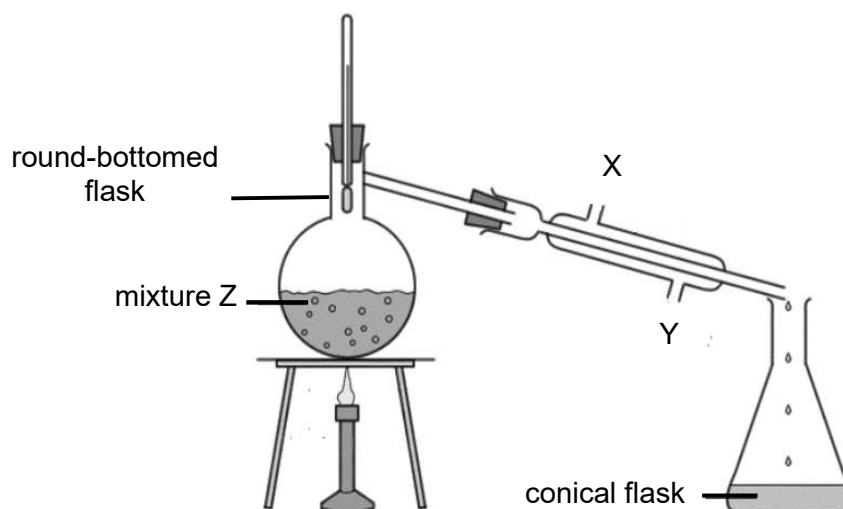
- 13** Which mixture can be separated by magnetic attraction?

- A** copper and gold coins
- B** iron and brass fillings
- C** iron and steel pins
- D** plastic and aluminium foil

- 14** Which two separation techniques are used to purify sewage water to obtain NEWater?

- A** distillation and filtration
- B** microfiltration and evaporation
- C** microfiltration and reverse osmosis
- D** simple distillation and chromatography

- 15 The diagram shows a set-up to separate the components of a mixture, Z.



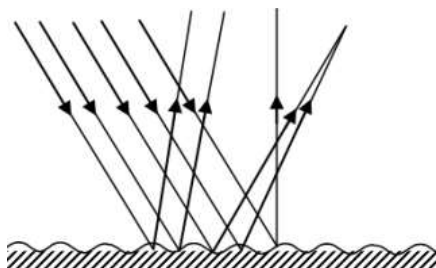
Which row about X, Y and Z is correct?

	X	Y	Z
A	water in	water out	salt solution
B	water in	water out	solid salt and sand
C	water out	water in	salt solution
D	water out	water in	solid salt and sand

- 16 Which statement best explains why we can see non-luminous objects?

- A The objects absorb the light rays.
- B The objects bend the light rays so that the light rays can enter our eyes.
- C The objects give out light on their own.
- D The objects reflect light off their surfaces into our eyes.

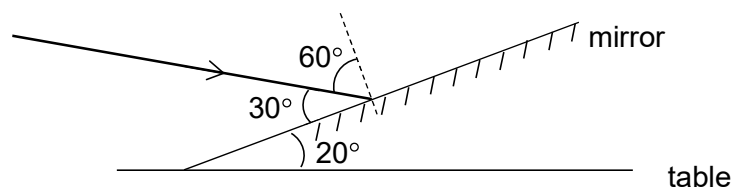
- 17 The diagram shows light rays hitting a surface.



Which row correctly describes the diagram?

	type of reflection	material of reflecting surface	image formed
A	irregular	mirror	clear
B	irregular	paper	no image formed
C	regular	glass	clear
D	regular	still water	no image formed

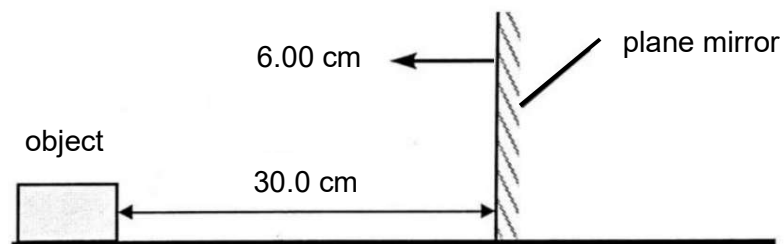
- 18 A ray of light is directed onto a mirror that is tilted at an angle of 20° from the table as shown in the diagram. The diagram is not drawn to scale.



What row correctly describes the angle of incidence and reflection?

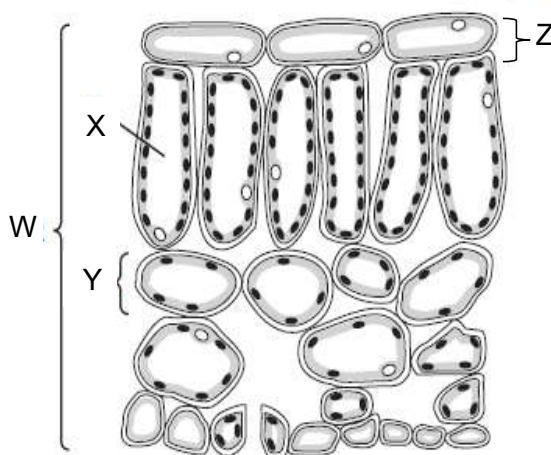
	angle of incidence / $^\circ$	angle of reflection / $^\circ$
A	20	20
B	30	30
C	60	60
D	80	80

- 19 A plane mirror is moved 6.00 cm towards the object.



What is the new distance between the object and its image formed in the mirror?

- A 24.0 cm
 - B 30.0 cm
 - C 48.0 cm
 - D 60.0 cm
- 20 The diagram shows a section through a leaf.



Which row correctly shows the tissue and the organ?

	tissue	organ
A	W	X
B	X	Y
C	Y	Z
D	Z	W

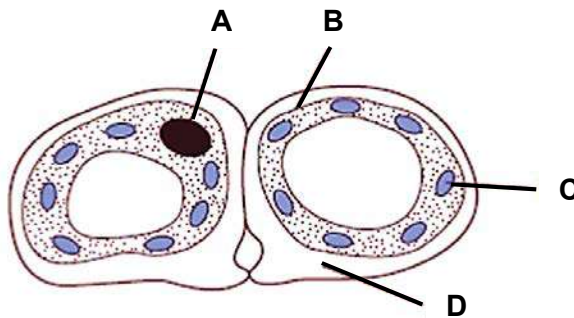
21 Which statements are **not** true about the nucleus of a cell?

- 1 It contains thread-like structures responsible for hereditary.
- 2 It contains tiny oval structures which have a green pigment to absorb sunlight.
- 3 It is made of tough outer covering and gives the cell its shape.
- 4 It is the site where all the chemical reactions take place within the cell.

- A** 1 and 4 only
B 1, 3 and 4 only
C 2 and 3 only
D 2, 3 and 4 only

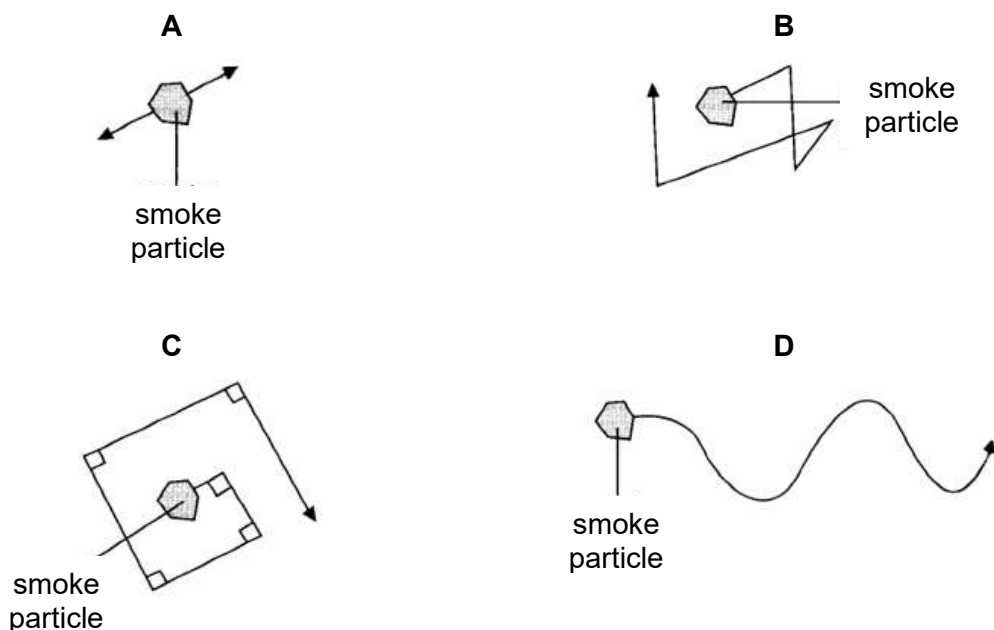
22 The diagram shows a cross section through two guard cells of a leaf.

Which part can only be found in a plant cell?



23 A student observes the Brownian motion of a bright speck of smoke particle through a light microscope.

Which diagram best represents the motion of the smoke particle?



- 24 In which conversion do water molecules move slower?



- A ice $\rightarrow$ steam
B ice $\rightarrow$ water
C steam $\rightarrow$ water
D water $\rightarrow$ steam
- 25 30.0 cm³ of liquid S is poured into 50.0 cm³ of liquid T. The total volume is 79.0 cm³.

Which statement explains the observation?

- A The liquid particles attract each other strongly.
B The particles in the liquid move slower and arrange themselves in fixed positions.
C The size of the particles in the two liquids differ, so the smaller particles occupy the spaces between the larger particles.
D The total mass of the mixture increases, which compresses the liquids into a smaller volume.

End of Paper 1

NAME: _____ ()

CLASS: 1 _____



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SECONDARY ONE

PAPER 2

Thursday, 03 Oct 2024

Total Duration for Paper 1 and 2:
1 hour 45 minutes

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No additional materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, register number and class in the spaces at the top of this page.
 You may use an HB pencil for any diagrams, graphs, tables or rough working.
 Write in dark blue or black pen.
 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

Answer **all** questions.
 Write your answers in the spaces provided on this paper.

Section B

Answer **one** question.
 Write your answers in the spaces provided on this paper.

A copy of the Periodic Table is printed on page **18**.
 The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE			
PAPER 1	PAPER 2		TOTAL
	Section A	Section B	
25	50	10	85

This document consists of **18** printed pages (including this cover page).

[Turn over

Section A: 50 marks

Answer **all** the questions in the spaces provided.

- 1** A student carried out an experiment to find out the volume of water that four different materials, **A**, **B**, **C** and **D** can absorb. She placed each material over a beaker and poured 50.0 ml of water onto the material one at a time. Fig. 1.1 shows the experimental set-up.

She then recorded the volume of water obtained in the beaker after the material absorbed some water. Table 1.2 shows the volume of water collected in each beaker.

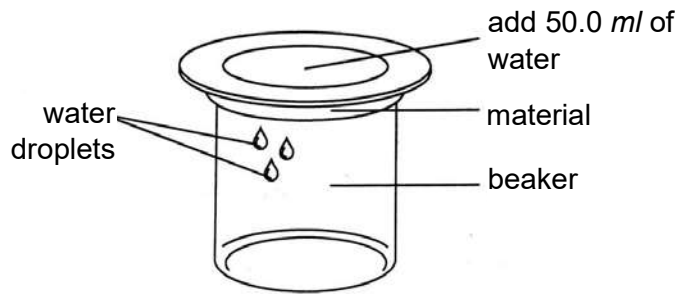


Fig. 1.1

Table 1.2

material	volume of water in beaker (ml)
A	24.0
B	10.0
C	31.0
D	6.00

- (a)** Identify one independent variable, one dependent variable and one constant variable.

(i) independent variable: [1]

(ii) dependent variable: [1]

(iii) constant variable: [1]

- (b)** State a possible hypothesis for this experiment.

.....
 [1]

[Total: 4]

2 Fig. 2.1 shows a Bunsen burner.

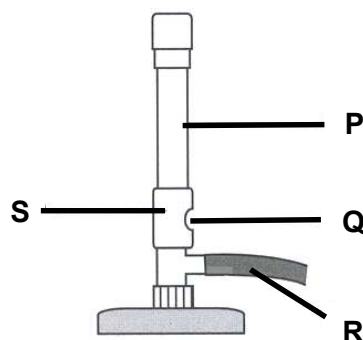


Fig. 2.1

(a) Name the parts of the Bunsen burner shown in Fig. 2.1.

P: Q:

R: S: [2]

(b) Suggest a suitable material that can be used to make part **R** and state the property of the material which makes it suitable to make part **R**.

..... [1]

(c) A student wanted to use a Bunsen burner to heat some chemicals strongly.

She wrote the instructions in Fig. 2.2 to turn on the Bunsen burner for strong heating. She made several mistakes in her instructions.

In Table 2.3, identify two mistakes and suggest two corrections for these mistakes.

1. Wear safety goggles.
2. Check that there are no cuts on **R** as it is connected to gas tap.
3. Turn **S** to open **Q** fully.
4. Turn on the gas tap.
5. Place the lighter at the top of **P**.
6. Light the lighter.
7. Close **S**. A luminous flame is now produced for strong heating.

Fig. 2.2

Table 2.3

student's mistake	corrections to mistake

[4]

[Total: 7]

- 3 A student was tasked to investigate the density of an irregularly-shaped object for a project.

She first measured the mass of the Petri dish and then the mass of the Petri dish with the object using an electronic balance as shown in Fig. 3.1 and Fig. 3.2 respectively.

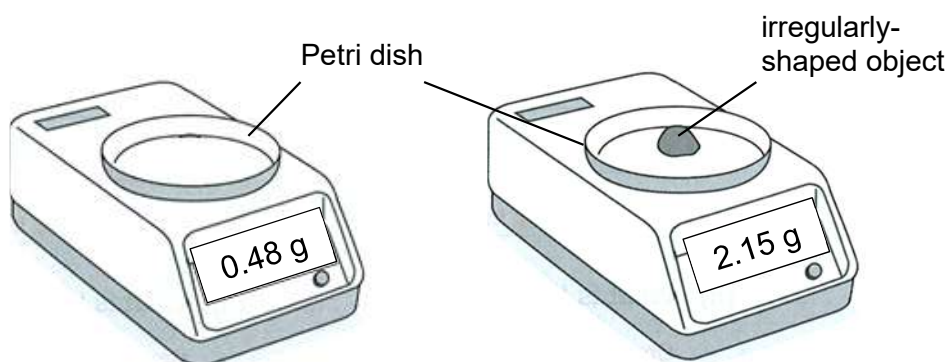


Fig. 3.1

Fig. 3.2

- (a) Calculate the mass of the object.

mass of object = g [1]

- (b) Given that the object has a volume of 1.40 cm^3 , calculate its density in g / cm^3 .

Show your workings clearly.

density = g / cm^3 [2]

- (c) The student placed the same object into a beaker of pure water as shown in Fig. 3.3.

The object is removed from the beaker, dried with a piece of cloth and then transferred into another beaker of solution **X** as shown in Fig. 3.4.

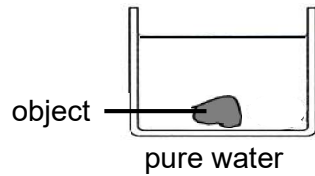


Fig. 3.3

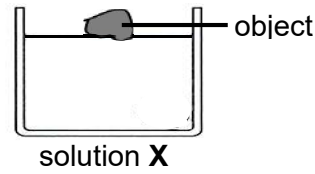


Fig. 3.4

With reference to Fig. 3.3 and Fig. 3.4,

- (i) state which liquid, pure water or solution **X**, has a higher density,

..... [1]

- (ii) explain your answer in (c)(i).

.....

.....

..... [2]

[Total: 6]

- 4 (a) A student conducted a chromatography experiment using two different solvents, water and alcohol, to investigate which pen ink is easiest to remove from human skin.

Fig. 4.1 shows the experiment set-up used for the experiment.

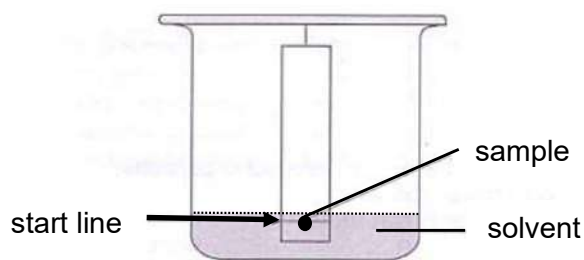


Fig. 4.1

A mistake in the set-up of the experiment was spotted by the teacher and the set-up was corrected.

With reference to Fig. 4.1, state the mistake in the set-up of the experiment.

Explain what will happen if the mistake is **not** corrected.

.....

..... [2]

- (b) Fig. 4.2 shows two chromatograms, **P** and **Q**, obtained using four different coloured pen inks (black, blue, green and red) in two solvents, water and alcohol.

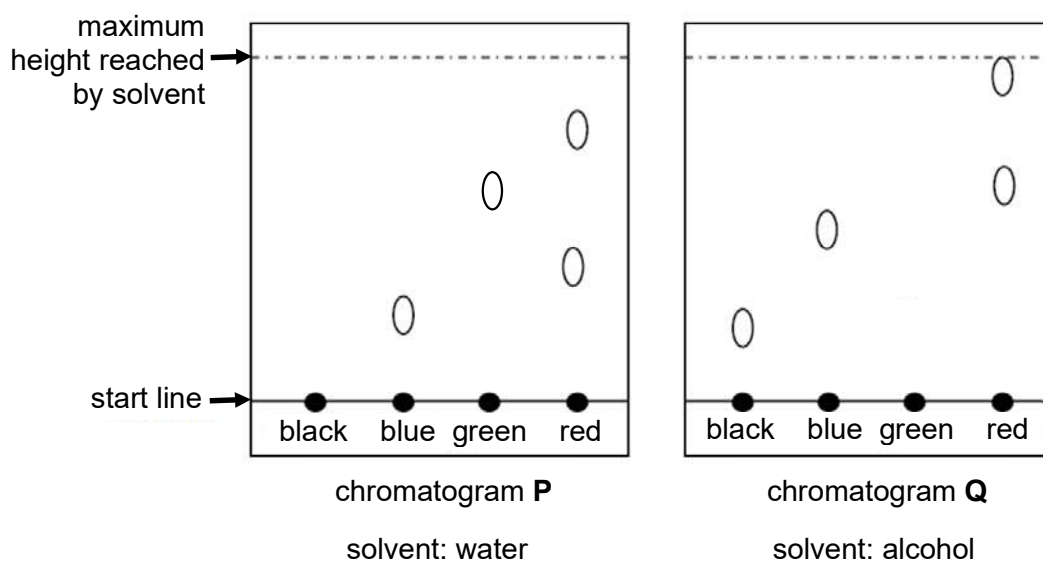


Fig. 4.2

With reference to Fig. 4.2, complete Table 4.3 by placing a tick (✓) in a box in each row to identify if the inks are soluble in water only or in alcohol only, or in both solvents.

Table 4.3

ink	soluble in water only	soluble in alcohol only	soluble in both water and alcohol
black			
blue			
green			
red			

[4]

[Total: 6]

5 Fig. 5.1 shows an animal cell.

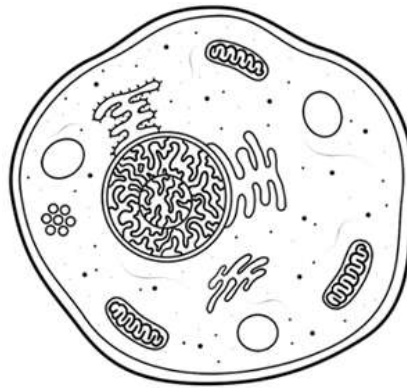


Fig. 5.1

(a) Label the following parts on Fig. 5.1.

(i) nucleus [1]

(ii) cell membrane [1]

(b) State the key function of the cell membrane.

..... [1]

(c) State the advantages of division of labour in cells.

.....

..... [2]

[Total: 5]

- 6 Fig. 6.1 shows a nerve cell. It allows the brain to control other parts of the body such as the muscles. Messages sent from the brain through nerves in the spinal cord enable the muscles in other parts of the body to contract.

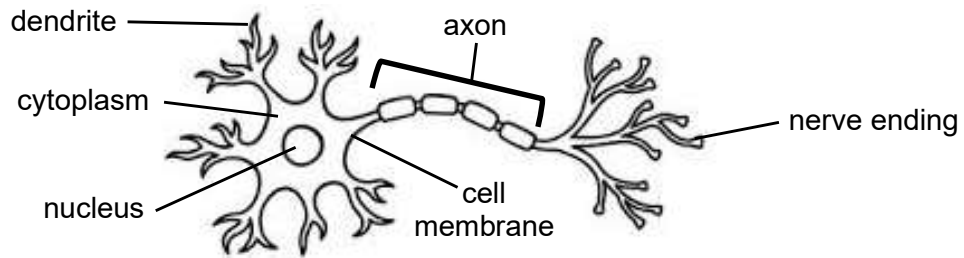


Fig. 6.1

- (a) The nerve cell is a specialised cell.

Identify two parts of the nerve cell which are **not** found in a typical animal cell.

..... and [1]

- (b) Suggest how a long axon allows the nerve cell to better perform its function.

.....
 [1]

- (c) Animals and plants are both considered multicellular organisms which are organised into tissues, organs and systems.

Read Fig. 6.2 about the human nervous system.

The basic units of the nervous system are called neurons. They are specialised cells that communicate through electrical signals. In the nervous system, the neurons can combine to form grey matter and white matter. These matters are mainly situated in the brain, spinal cord and other bones to help coordinate body movement in a human.

Fig. 6.2

Using the terms found in Fig. 6.2, state one example each of a cell, tissue, organ and system found in humans. An example has been done for you in Fig. 6.3.

cell	tissue	organ	system	organism
				Human

Fig. 6.3

[2]

[Total: 4]

- 7 A student was shown a diagram of a unicellular organism in Fig. 7.1.

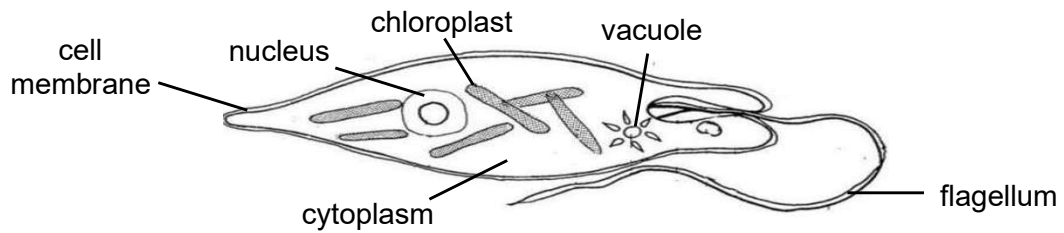


Fig. 7.1

- (a) The student noticed that the vacuole in this organism is unlike the vacuoles in a typical plant and animal cell.

Compare the difference of this vacuole in this organism

- (i) with the vacuoles in a typical plant cell,

.....
 [1]

- (ii) with the vacuoles in a typical animal cell.

.....
 [1]

- (b) State a feature of this organism that is found only in a typical plant cell.

..... [1]

[Total: 3]

8 Fig. 8.1 shows six diagrams (A – F) of particles in different substances.

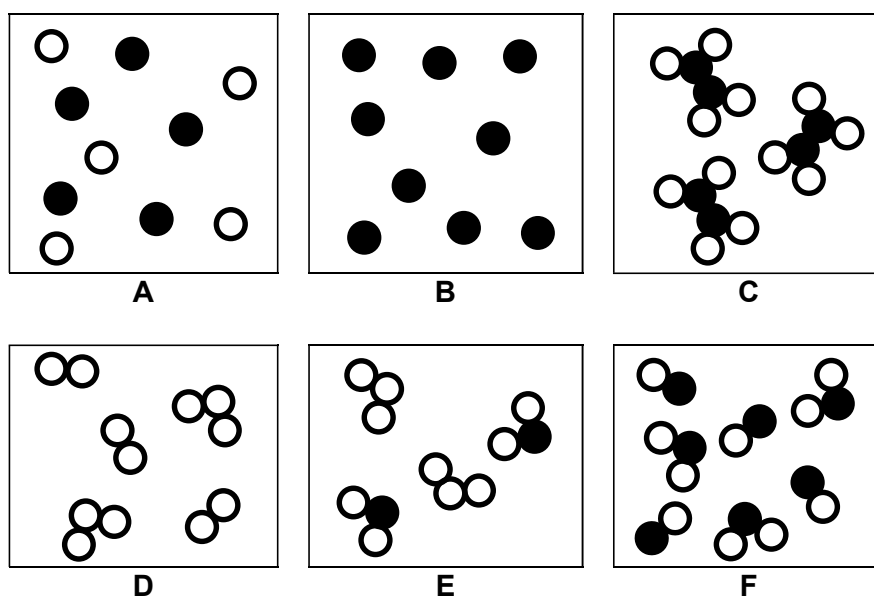


Fig. 8.1

(a) Each letter may be used once, more than once, or not at all.

List down the letter which best represents a

(i) pure element: [1]

(ii) pure compound: [1]

(iii) mixture of element and compound: [1]

(b) State two differences between a mixture and a compound.

.....

.....

.....

..... [2]

[Total: 5]

- 9 Fig. 9.1 shows a tanker used to transport petrol.

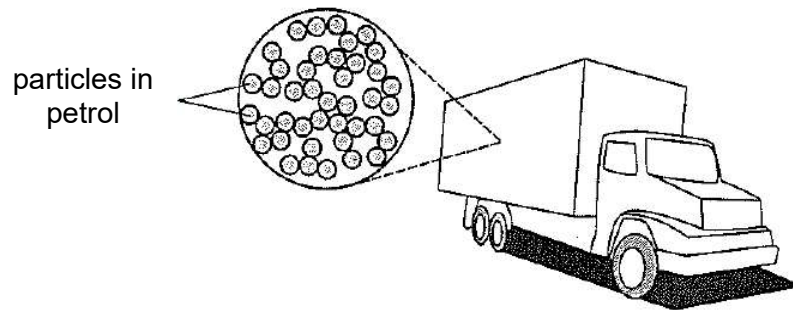


Fig. 9.1

- (a) With reference to Fig. 9.1,

- (i) identify the physical state of the petrol,

..... [1]

- (ii) explain your answer in (a)(i).

.....

 [2]

- (b) Natural gas energy source is volatile and changes into gas under certain conditions.

- (i) Describe the movement and arrangement of particles in gaseous state.

movement:
 [1]

arrangement:
 [1]

- (ii) Draw in the space below the particles of natural gas in gaseous state.



[1]

[Total: 6]

- 10 Peter found out that his floor tiles have popped up on a very hot day as shown in Fig. 10.1.

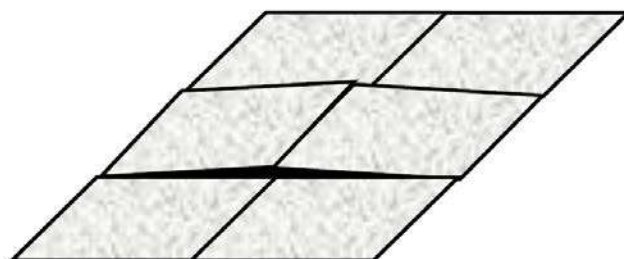


Fig. 10.1

- (a) Using the particulate nature of matter, explain why the tiles have popped up.

.....

.....

.....

.....

..... [3]

- (b) Suggest what could be done to prevent this from happening.

..... [1]

[Total: 4]

Section B: 10 marks

Answer **one** question in this section.

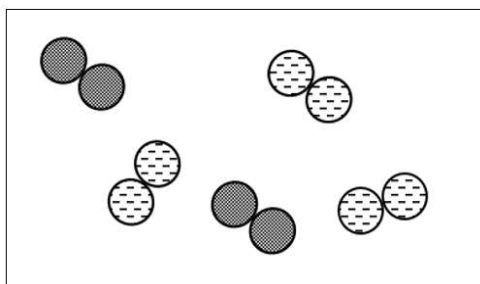
- 11 (a)** Table 11.1 shows some information about four substances **E**, **F**, **G**, and **H**.

Table 11.1

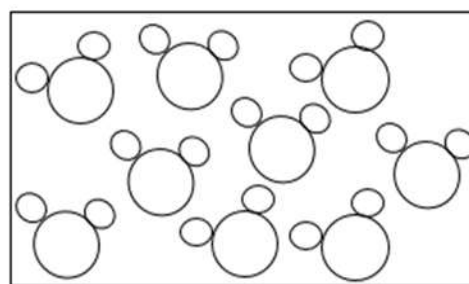
substance	description of substance
E	It is a substance that has a fixed composition. It is made up of two different types of elements.
F	It is a gas consisting of two different types of substances. It has variable melting points.
G	It is a gas which can be separated into four different types of substances.
H	It is a grey solid which cannot be decomposed into anything simpler.

Fig. 11.2 shows four different representations of the substances **E**, **F**, **G**, and **H**.

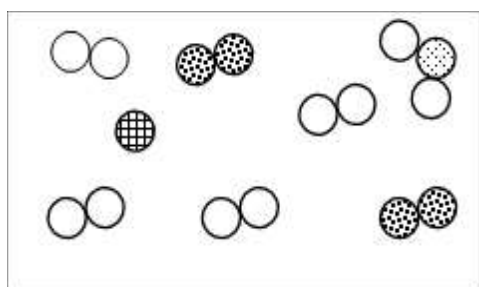
Match the diagrams in Fig. 11.2 with the description of the substances in Table 11.1.



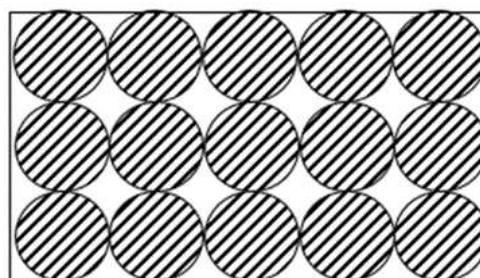
(i)



(ii)



(iii)



(iv)

Fig. 11.2

[2]

- (b) Fig. 11.3 shows how the solubility of the four different substances, **E**, **F**, **G**, and **H** vary with temperature.

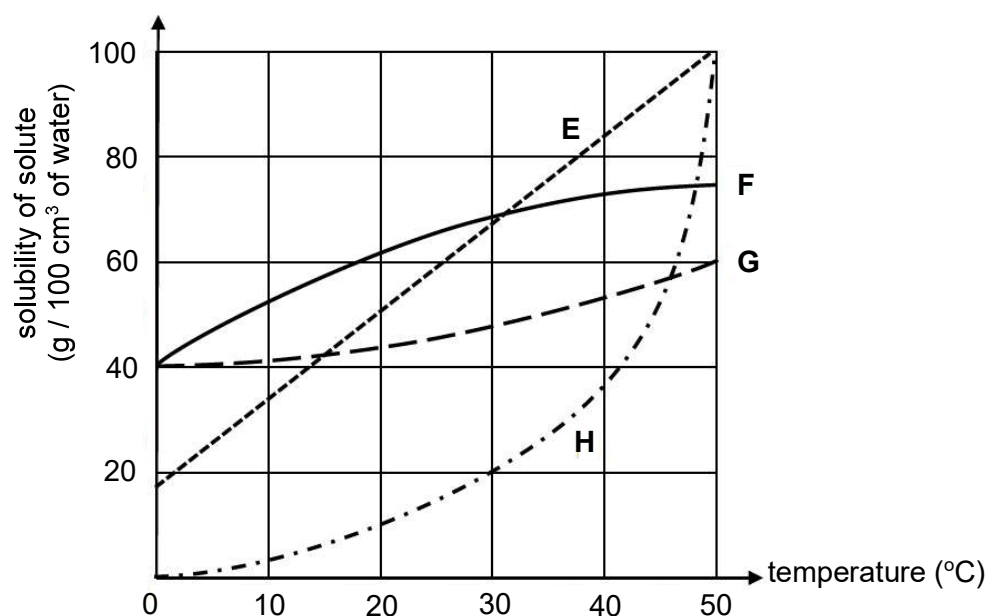


Fig. 11.3

- (i) State which two substances have the same solubility at 15.0 °C.
 [1]
- (ii) State which substance has the solubility least affected by temperature.
 [1]
- (iii) Predict the mass of **H** that can dissolve in 200 cm³ of water at 30.0 °C.

mass of H = g [1]

- (c) A student accidentally mixed some **E** and **H** together in the laboratory. The temperature in the laboratory was 30.0 °C.

Fig. 11.4 shows the separation technique used by the student to separate the mixture.

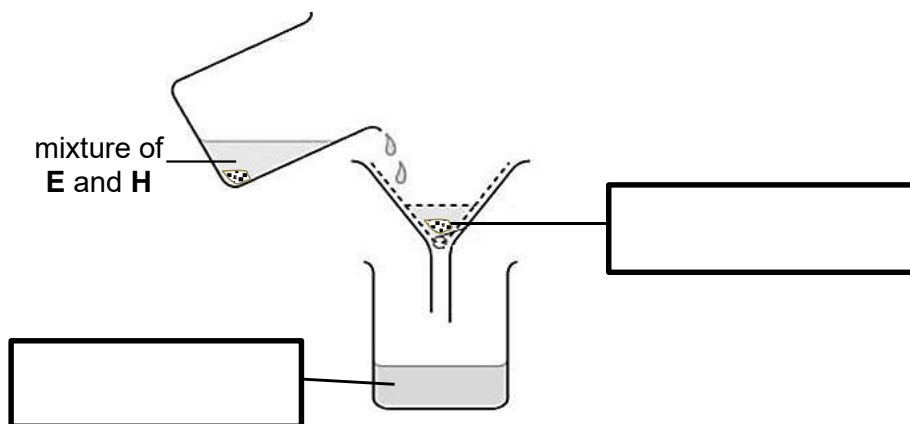


Fig. 11.4

- (i) On Fig. 11.4, fill in each box with a term used to describe the components after separating the mixture. [2]

- (ii) State the temperature at which this separation technique would work to **fully** separate **E** and **H** given that the solvent used is water.

..... [1]

- (iii) Explain why this separation technique would not be possible at 50.0 °C given that the solvent used is water.

.....

 [2]

[Total: 10]

- 12 (a) Fig. 12.1 shows an object placed in front of a plane mirror.

On the grid provided, draw the image of the object formed behind the mirror.

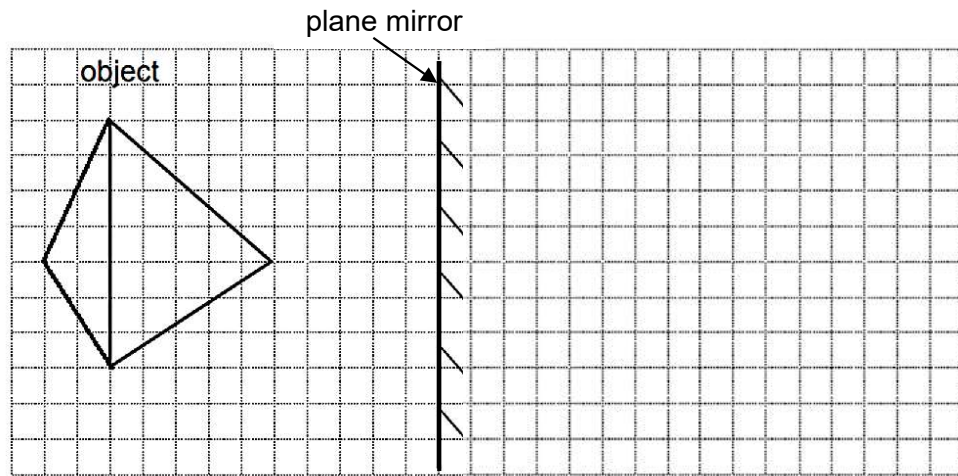


Fig. 12.1

[2]

- (b) The word "SUPERB" contains 6 letters.

- (i) These 6 letters are placed in front of the mirror in Fig. 12.1.

In the space below, write down how the image of SUPERB will look in the plane mirror.

[1]

- (ii) State the number of letters that appears to be different in the mirror when compared to the actual letters.

..... [1]

- (iii) State a characteristic of the image formed by the mirror that results in the letters to appear different.

..... [1]

- (iv) List down **two other** characteristics from **12(b)(iii)** of an image formed by a plane mirror.

.....

 [2]

- (c) A point source of light at point **P** is placed at the bottom of a water tank as shown in Fig. 12.2. **PQ** and **PR** are rays emitted from the light source which hits the water surface at **Q** and the plane mirror surface at **R** respectively.

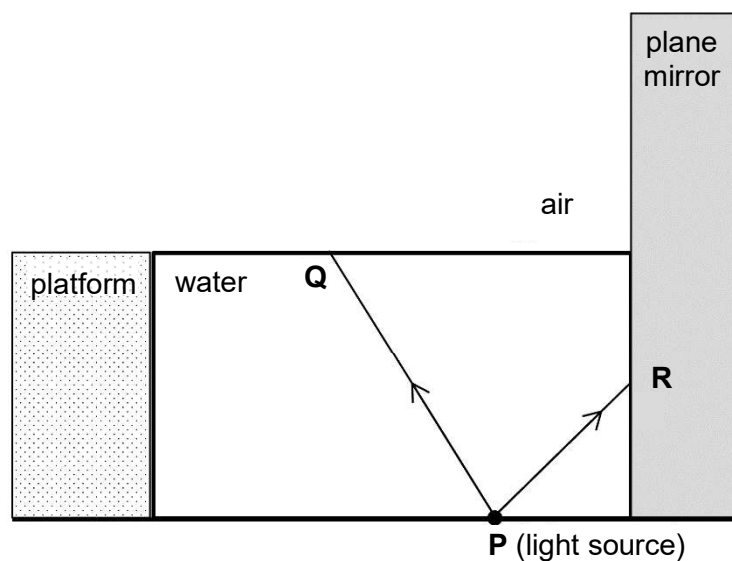


Fig. 12.2

On Fig. 12.2, label the angle of incidence at **Q** as i .

Measure and write down the angle i .

$i = \dots\dots\dots$ [1]

- (d) On Fig. 12.2,

(i) draw the subsequent path for **PQ** as it enters the air, [1]

(ii) draw the subsequent path for **PR** as it reflects off the plane mirror. [1]

[Total: 10]

END OF PAPER 2

The Periodic Table of Elements

Group																									
1	2	Key												13	14	15	16	17	18						
		proton (atomic) number atomic symbol name relative atomic mass												1 H hydrogen 1											
3 Li lithium 7	4 Be beryllium 9																								
11 Na sodium 23	12 Mg magnesium 24	3	4	5	6	7	8	9	10	11	12							5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20		
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	lanthanoids 57-71		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 -	actinoids 89-103		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	euroium	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
	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	—





2024 Sec1Sci G3 EOY Answer key

FSAU – Max 2 mark

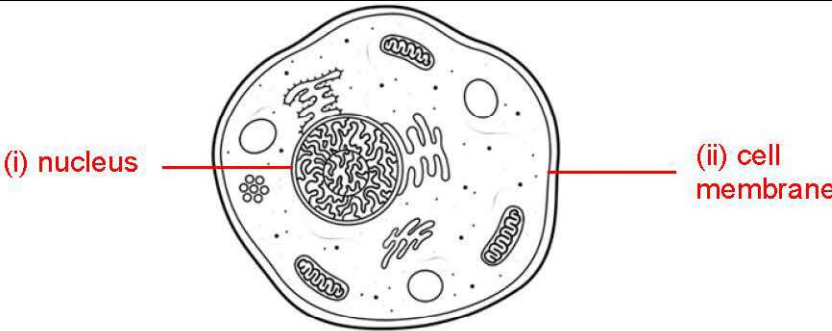
Paper 1 MCQ (25 marks)

1	2	3	4	5	6	7	8	9	10
B	D	B	C	A	B	A	D	A	D
E	E	E	E	H	M	M	H	E	H
11	12	13	14	15	16	17	18	19	20
A	D	B	C	C	D	B	C	C	D
M	E	M	E	E	M	E	E	H	M
21	22	23	24	25					
D	D	B	C	C					
E	H	E	E	E					

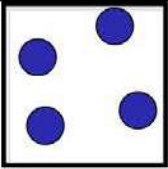
H	M	E
5	6	14
20 %	24 %	56 %

Paper 2 (30 marks)**Section A (22 marks)**

Qns.	Suggested Answer	Marks	E/M/H
1(a)(i)	independent variable: <u>Type of material / Absorbing property of material</u>	1	M
(a)(ii)	dependent variable: <u>volume of water</u> in beaker	1	E
(a)(iii)	constant variable: <u>time taken</u> after water is poured onto the material / <u>thickness of material</u> / <u>volume of water poured onto the material</u>	1	E
(b)	As the <u>type of material changes</u> / <u>absorbing property of material increases/decreases</u> , the <u>amount of water absorbed changes</u> / <u>increases/decreases</u> .	1 Allow ECF	H
2(a)	P: <u>barrel</u> Q: <u>air hole</u> R: <u>rubber/gas tubing/tube</u> S: <u>collar</u> 1 mark for 2 correct answers spelling error is penalised.	2	E
(b)	name of material: <u>Rubber / Plastic</u> property of material: <u>flexibility / flexible</u> 1 mark for both correct answer	1	M

(c)	student's mistake	corrections to mistake	2	E		
	Turn S to open Q fully	Turn S to <u>close Q</u> fully				
	Close S. A luminous flame is now produced for strong heating	<u>Half-open/Open S. A non-luminous flame</u> is now produced for strong heating.				
1 mark for each correct answer						
3(a)	Mass = 2.15-0.48 = 1.67 g		1	E		
(b)	Density = mass / volume = 1.67 / 1.40 [allow ECF] = 1.19 g/cm ³		1	E		
			1	E		
(c)(i)	Solution <u>X</u> has a higher density.		1	H		
(c)(ii)	The object <u>sinks in pure water</u> hence it is <u>denser than pure water</u> .		1	M		
	The object <u>floats in Solution X</u> hence it is <u>less dense than Solution X</u> .		1	H		
	Density of pure water < object < Solution X.					
4(a)	The <u>start line is not above the solvent/ in the solvent</u> .		1	E		
	This will cause the <u>mixture to dissolve in the solvent</u> .		1	M		
(b)	ink	soluble in water only	soluble in alcohol only	soluble in both water and alcohol	2 1 1	E M H
	black		✓			
	blue			✓		
	green	✓				
	red			✓		
	1 mark for 1 correct tick					
5(a)(i) and(ii)			1 1	E M		

(b)	Cell membrane <u>controls the movement of substances in and out of the cell.</u>	1	E
(c)	It allows various <u>functions to be carried out efficiently (1M) and functions to be performed at the same time (1M).</u>	2	E
6(a)	Dendrite / axon / nerve ending Any 2 correct answers	1	E
(b)	Any one of the following: • <u>Long and narrow extension/ protrusion</u> • <u>Large surface area to volume ratio</u> • <u>Messages</u> from the brain can be sent faster/further to other parts of the body.	1	H
(c)	Cell neuron Tissue grey matter or/and white matter Organ brain / spinal cord / bone System nervous system Organism Human 1 mark for 2 correct answers	2	M
7(a)(i)	Plant cell has <u>one large vacuole</u> but <u>this organism has one small vacuole.</u>	1	M
(a)(ii)	Animal cell has <u>numerous/many small vacuoles</u> but <u>this organism has only one vacuole.</u>	1	E
(b)	<u>chloroplast</u>	1	E
8(a)(i)	B	1	M
(a)(ii)	C	1	E
(a)(iii)	E	1	H
(b)	1. Components in a <u>mixture can be separated by physical methods</u> but elements in a <u>compound can be separated by chemical or electrical method.</u> 2. <u>Mixture has the same physical and chemical properties as its components</u> but <u>compound has different physical and chemical properties from its constituent elements.</u> 3. <u>No chemical reaction takes place/ little or no energy change when mixture is formed</u> but <u>chemical reaction takes place/heat and light is given off when compound is formed.</u> 4. <u>Components</u> in a <u>compound are in a fixed composition</u>, while components in a <u>mixture are not in fixed composition.</u> Any 2 correct comparisons	2	M

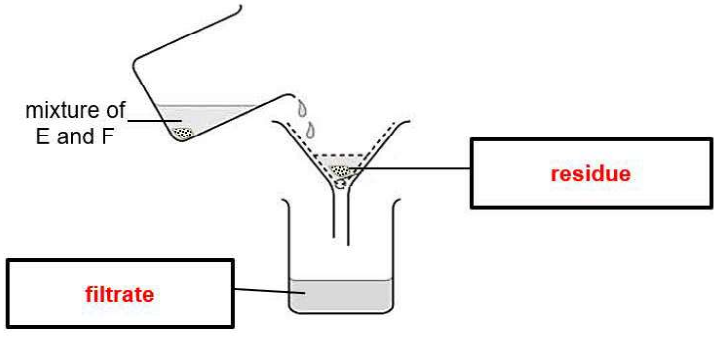
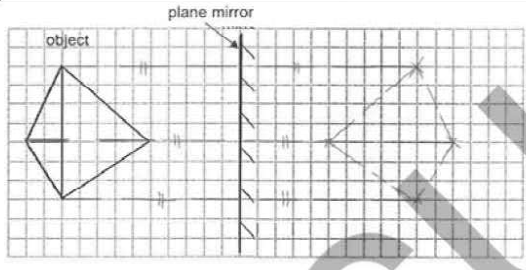
9(a)(i)	liquid	1	E
(a)(ii)	The particles are <u>packed closely together</u> in <u>disorderly manner</u> . Not accepted: particles slide past one another. Do not allow ECF.	2	E
(b)(i)	movement: Particles <u>move</u> randomly at <u>high speed</u> . arrangement: Particles are <u>far apart</u> from one another in <u>disorderly manner</u> .	1 1	E E
(b)(ii)	 Circles are same size and far apart in random arrangement	1	E
10(a)	The heat from the sun causes the tile <u>solid particle to gain energy</u> and <u>move further apart</u> , <u>increasing the volume</u> of tile, causing it to <u>expand</u> and pop up.	1 1 1	M H E
(b)	The <u>tiles can be placed further apart</u> to allow gap for expansion. / Expansion gap could be built between tiles.	1	H

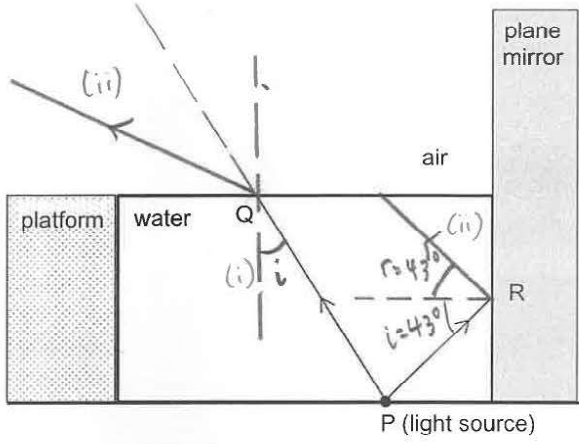
Overall for Section A:

H	M	E
10	13	27
20 %	26 %	54 %

Section B (10 mark)

11(a)	(i) <u>F</u> (ii) <u>E</u> (iii) <u>G</u> (iv) <u>H</u> 1 mark – 2 correct answers	2	M
(b)(i)	<u>E and G</u>	1	E
(b)(ii)	<u>G</u>	1	E
(b)(iii)	Solubility of H at 30 °C = 20 g in 100 cm ³ of water Mass of H that can dissolve in 200 cm ³ of water = 20 x 2 = <u>40.0 g</u>	1	M

(c)(i)	 1 mark for each correct box	2	E
(c)(ii)	0 °C	1	H
(c)(iii)	Both E and H has the same solubility in water at 50 °C, so both will dissolve in water and there is no residue of E and H to be separated / both E and H will be collected as filtrate / both E and H will not be separated.	1 1	M H
12(a)	 1 mark for equal perpendicular distance from mirror. No mark penalized for no dotted perpendicular line with 2 small lines 1 mark for dotted image line	2	M
(b)(i)	 Lateral inversion of each letter and whole word No mark penalized for solid or dotted image line	1	E
(b)(ii)	5 Allow ECF from 12(b)(i)	1	E
(b)(iii)	Laterally inverted/inversion	1	E
(b)(iv)	1. same size as the object 2. virtual 3. upright 4. perpendicular distance between the image and the mirror is equal to the perpendicular distance between the object and the mirror. Any 2 answers	2	E
(c)	$i = 32^\circ$ Accept between 30-34° For both correct value and label . Take note of unit. No mark awarded for no unit	1	M

(d)(i) and (ii)	 1M – correct reflected ray at R (angle of incidence and reflection is 45°) 1M – correct refracted ray at Q	2	H
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Overall for Section B:

H	M	E
4	7	9
20 %	35 %	45 %