AHMAD IBRAHIM SECONDARY SCHOOL
TERM 1 WEIGHTED ASSESSMENT 1 2023

SECONDARY 3 EXPRESS

Name:	Class:	Register No.:

CHEMISTRY **6092**

2 March 2023

45 minutes

READ THESE INSTRUCTIONS FIRST

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

Write down your name, class and register number in the spaces at the top of this page.

This paper consists of **TWO** sections.

Section A – 10 marks

Section B – 20 marks

Section A consists of 10 multiple choice questions. Answer **ALL** questions.

For each question, four suggested answers are given. You are to choose the most appropriate one and indicate it in the boxes provided.

Answer **ALL** questions in **Section B** in the spaces provided on the **Question Paper**.

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

The use of calculator is allowed in this examination.

A copy of Periodic Table is provided at the last page.

FOR EXAMINER'S USE	
Section A	**/ 10**
Section B	**/ 20**
TOTAL	**/ 30**

This question paper consists of **15** printed pages

[Turn over

Section A

*Answer **ALL** questions and write your answers in the boxes below.*

Qns	1	2	3	4	5	6	7	8	9	10
Ans	B	B	C							

1 Which apparatus can be used for the accurate measurement of 25.0 cm^3 of a solution?

I 25 cm^3 pipette

II 50 cm^3 burette

III 50 cm^3 beaker

IV 50 cm^3 measuring cylinder

A **II** only

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

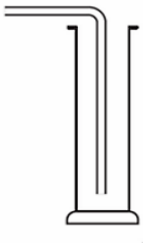
C **II** and **III** only

D **II** and **IV** only

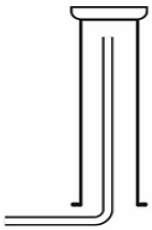
2 Which apparatus **cannot** be used to collect a gas that is denser than air and is insoluble

in water?

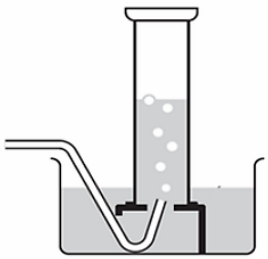
A



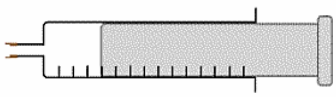
B



C



D



3 Which method is used to obtain copper(II) chloride crystals from a solution of copper(II) chloride?

A evaporation

B distillation

C crystallisation

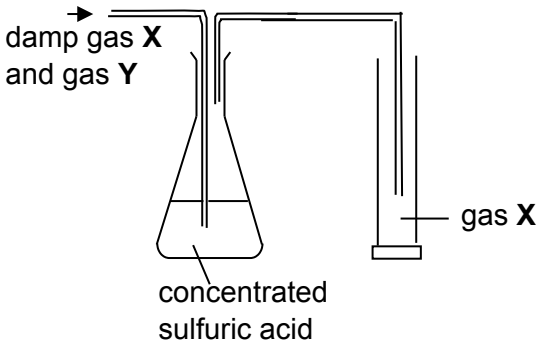
D paper chromatography

4 Some properties of gas **X**, gas **Y** and concentrated sulfuric acid are given in the table below.

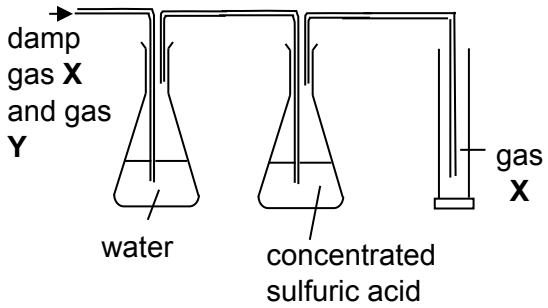
substance	properties
gas **X**	• insoluble in water • neutral gas
gas **Y**	• very soluble in water • acidic gas
concentrated sulfuric acid	• very corrosive • pungent, colourless liquid • powerful dehydrating agent

Which diagram shows the correct set-up to collect pure, dry sample of gas **X** from a sample of damp gas **X** contaminated with gas **Y**?

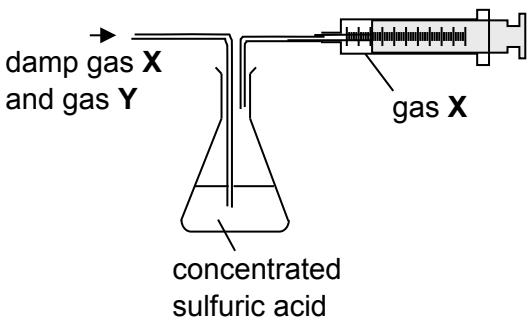
A



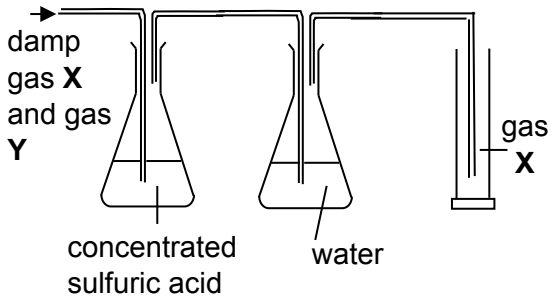
B



C



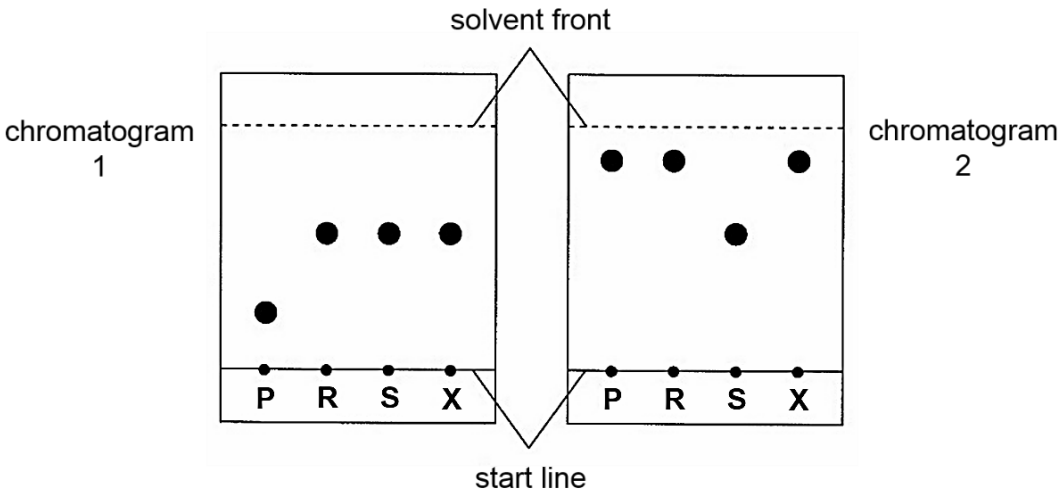
D



5 Ink **X** was suspected to contain one or more of the dyes **P**, **R** and **S**.

Spots of each dye were placed on the starting lines of two pieces of chromatography paper.

One paper was placed into water (chromatogram 1) and the other with ethanol (chromatogram 2).



What is the identity of **X**?

A **R** only

B **P** only

C either **P** or **R** only

D **P**, **R** and **S**

6 A sample of a compound, allyl isocyanide, was made from an experiment.

This compound has been patented as a non-lethal weapon as it has an extremely penetrating and foul smell.

Which property of the compound can be used to check its purity?

A colour

B pH value

C boiling point

D solubility in water

7 Dry ice is solid carbon dioxide which sublimes readily at room temperature.

Which statement best describes what happens when dry ice sublimes?

A Particles start to become bigger.

B Stationary particles start to vibrate vigorously.

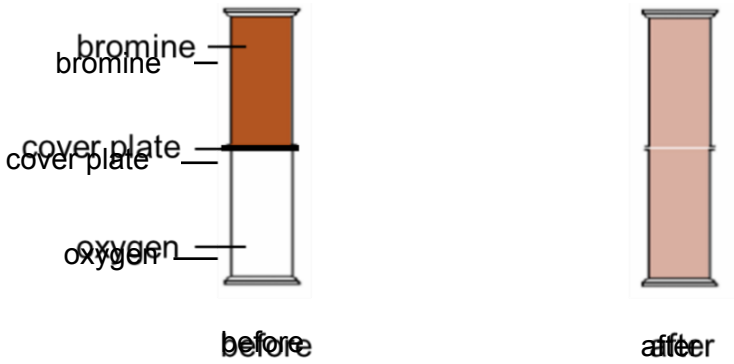
C Distance between particles increases.

D Vibrating particles start to slide over each other.

8 Two gas jars containing separate samples of bromine gas and oxygen gas are separated by the cover plate as shown in the diagram.

The cover plate is then removed from the gas jars.

After several days, the colour of the gas is the same in both jars as shown below.



Which statement explains this change?

A Bromine gas is denser than oxygen gas.

B Bromine and oxygen molecules are in random motion.

C Bromine and oxygen molecules diffuse at the same rate.

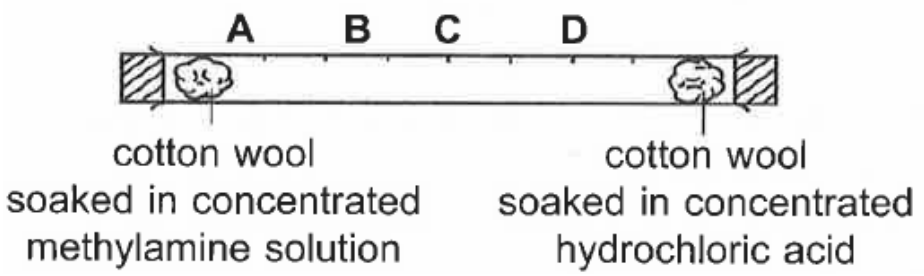
D Bromine and oxygen molecules reacted with each other.

9 Methylamine, CH_3NH_2 (Mr = 31), and hydrogen chloride, HC*l* (Mr = 36.5) are both gases which are soluble in water.

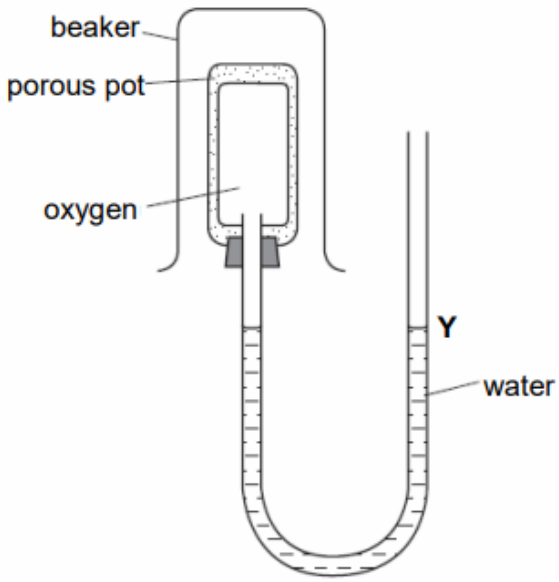
The gases react together to form a white solid, methylammonium chloride.

An experiment to demonstrate rates of diffusion is being set up as seen below.

At which location, **A**, **B**, **C** or **D**, will the white solid be seen?



10 The diagram shows an experiment on diffusion.



The water level does **not** move and remains at point **W**.

Which statement explains this?

A Gas **A** is unreactive.

B Gases **A** and **B** are insoluble in water.

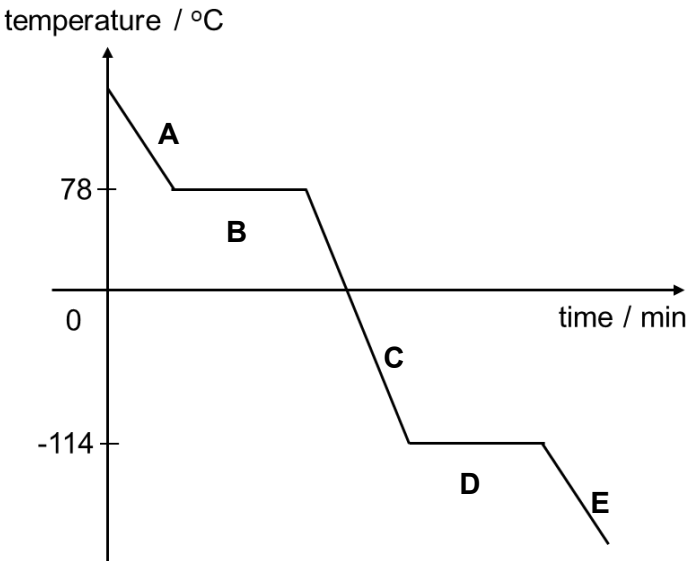
C Gases **A** and **B** have equal molecular masses.

D Gas **B** has a larger molecular mass than gas **A**.

Section B

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

1 The graph below shows the cooling curve of ethanol.



(a) Which region, **A**, **B**, **C**, **D** or **E**, shows ethanol in both liquid and gaseous state?

…… [1]

…

(b) Draw the arrangement of particles at 80 °C. [1]

(c) Describe how the **arrangement and movement of particles** in ethanol changes when its temperature decreases from 0 °C to −120 °C.

……

……

……

…… [2]
…

(d) Explain, in terms of the kinetic particle theory, what happens to the particles of ethanol as it is heated from −100 °C to 100 °C.

……

……

……

……

……

…… [3]
…

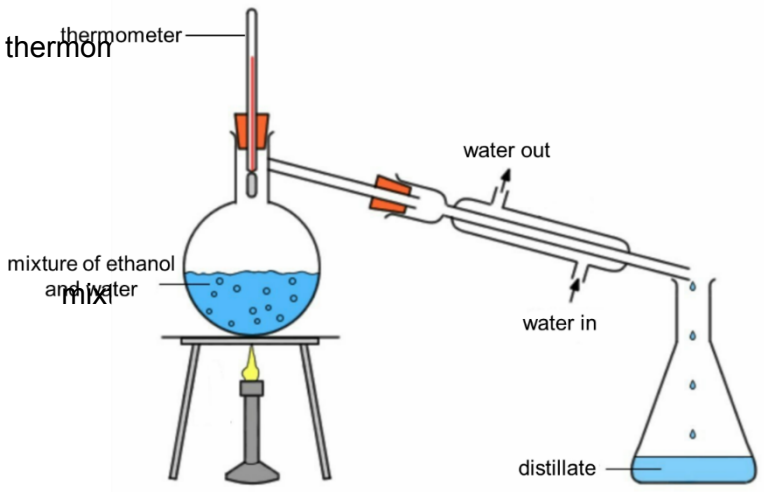
(e) In a practical assessment, students were tasked to design and conduct an experiment to separate a mixture of dichloromethane, ethanol and water. These are miscible liquids.

Upon collecting her sample, Emily noticed pieces of plastic in her sample.

(i) Draw a **labelled** diagram, indicating the apparatus and substances, to show how Emily can remove the pieces of plastic from her sample.

[2]

After removing the plastic pieces from her sample, Emily set up the apparatus as shown below to separate the mixture.



The boiling points of the components in a mixture are shown below.

component	boiling point / °C
dichloromethane	41

ethanol	78
water	100

(ii) Suggest what apparatus could Emily add to her set-up for a more efficient separation of mixture.

……...……...…… [1]

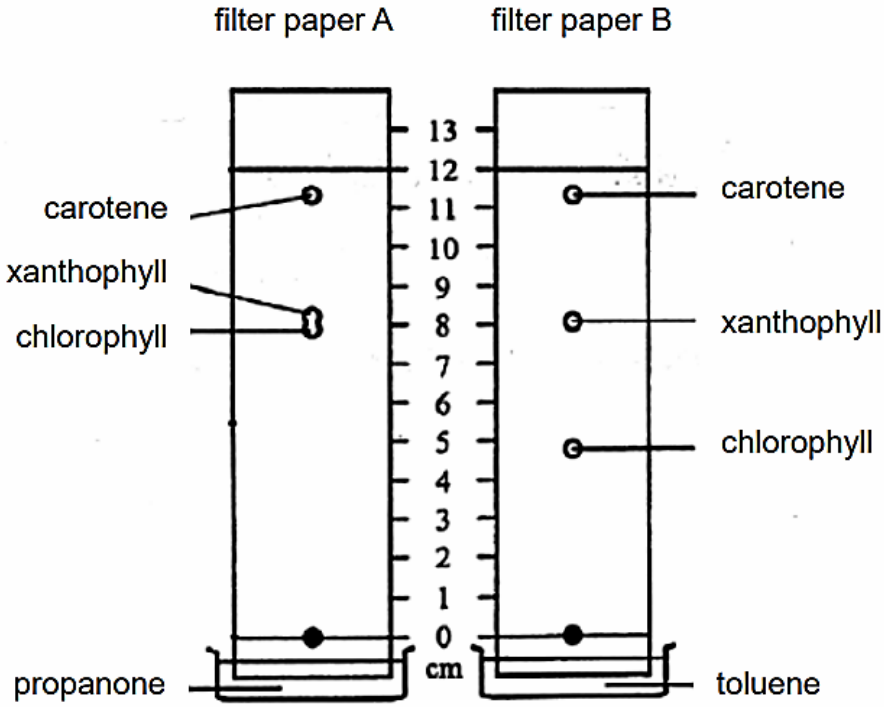
(iii) State which liquid would be collected last as the distillate. Explain why.

……
.

……..... [1]

[Total: 11]

2 Chromatography was carried out on a sample of pigments extracted from some leaves of a green plant. Two different solvents, propanone and toluene, were used at the same time and under the same conditions. The chromatograms are shown below.



(a) Explain why must the solvent level be below the sample spot at the start of the experiment.

……

…… [1]

…

(b) The spots of xanthophyll and chlorophyll overlap as shown in the chromatogram on filter paper **X**.

(i) Explain why the spots of xanthophyll and chlorophyll overlapped on filter paper **X**.

……...

…… [1]

.

(ii) Suggest a modification to the chromatography, **without** changing the solvent used, to obtain a better separation of these 2 spots.

……...

…… [1]

.

(c) Calculate the R_f value for carotene with toluene as the solvent.

Show all calculations.

[1]

(d) Phaeophytin is another pigment found in leaves of green plants.

It has an R_f value of 0.90 with propanone as a solvent.

On the diagram, draw and label the spot for this pigment on filter paper **X**.

Show all calculations.

[1]

[Total: 5]

3 (a) A student was tasked to obtain sugar from a mixture of salt and sugar.

Information about sugar and salt given to the student is as seen below:

	sugar	**salt**
Soluble in water?	Yes	Yes
Soluble in ethanol?	Yes	No

Below shows the procedural steps that this student has written for the task.

1. *Add water to the sugar and salt mixture and stir.*
2. *Filter the mixture.*
3. *Heat the filtrate till it is saturated.*
4. *Leave it to cool and crystallise.*
5. *Filter to collect the crystals.*
6. *Wash the crystals with warm distilled water to remove impurities.*

In the table below, state **two** mistakes that she has made in the procedural write up and suggest the correct rectifications.

	Mistake	Rectifications to the experiment
1.	…… …… …… …… …… ……	…… …… …… …… …… ……
2.	…… …… …… …… …… ……	…… …… …… …… …… ……

[2]

(b) This student observes that the perfume sprayed on her Chemistry teacher can be smelled in other parts of the classroom within a shorter time on hot days, compared to the colder rainy days.

Explain this observation.

……

……

……

…… [2]

[Total: 4]

END OF PAPER

Setter: Mrs Silia Goh

The Periodic Table of Elements

Group																
1	2											13	14	15	16	17
							1 H hydrogen 1									
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
11 Na sodium 23	12 Mg magnesium 24	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5
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
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
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 –
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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessin –

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 lawrenciu –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).
The Avogadro constant, $L = 6.02 \times 10^{23}\ mol^{-1}$.