O

CONVENT OF THE HOLY INFANT JESUS SECONDARY
Preliminary Examination in preparation for
the General Certificate of Education Ordinary Level 2024

CANDIDATE NAME	
CLASS	
REGISTER NUMBER	

SCIENCE (CHEMISTRY, BIOLOGY) 5088/01

Paper 1 Multiple Choice **28 August 2024**

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Write your name, class and register number on the Answer Sheet in the spaces provided unless this has been done for you.
Do not use staples, paper clips, glue, correction fluid or correction tape.

There are **forty** 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 separate Answer Sheet.

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 booklet.

A copy of the Data Sheet is printed on page 23.
A copy of the Periodic Table is printed on page 24.

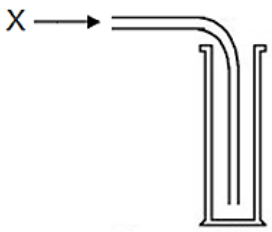
The use of an approved scientific calculator is expected, where appropriate.

1 A gas has the following properties.

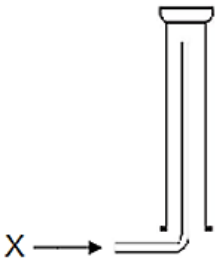
- less dense than air
- insoluble in water

Which method **cannot** be used to collect the gas?

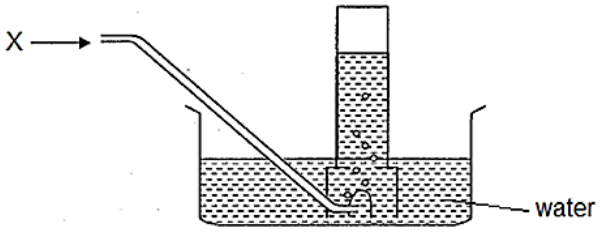
A



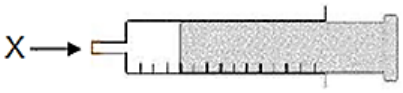
B



C



D



2 A sample of iodine crystals (solid) is at room temperature and pressure.

Which statement about the particles in the sample is correct?

A The particles are arranged in a giant lattice. (refers to structure of ionic substances)

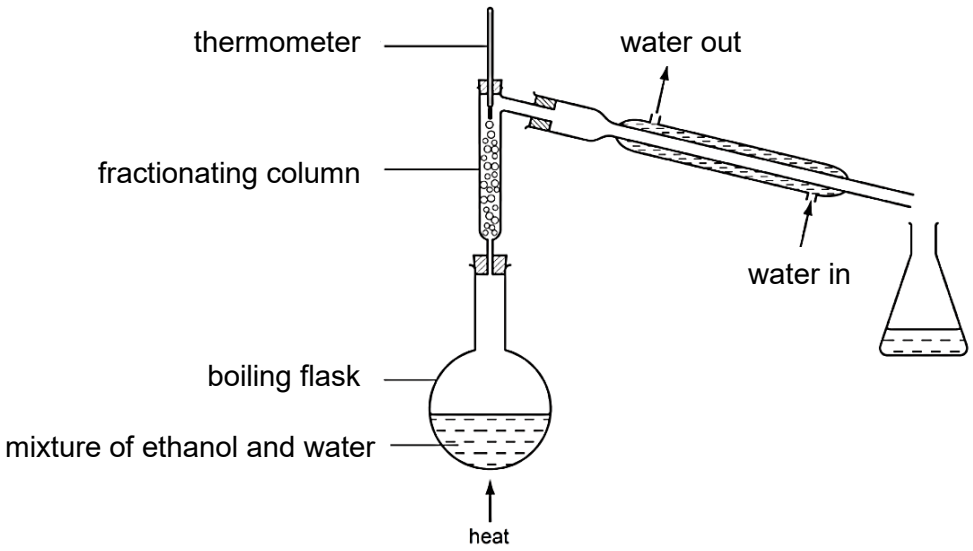
B The particles do not have kinetic energy.

C The particles move randomly through the solid.

D The particles vibrate about a fixed point.

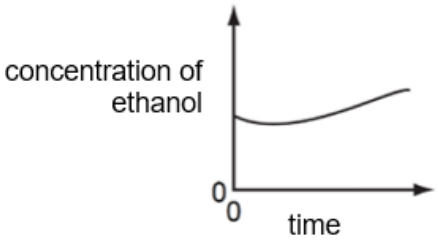
3 The apparatus shown is used to distil a dilute solution of ethanol in water. The boiling point of ethanol is 78 °C and the boiling point of water is 100 °C.

ethanol is distilled off first

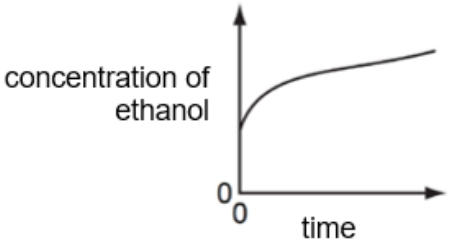


Which graph shows the change in concentration of the ethanol in the boiling flask as the distillation proceeds?

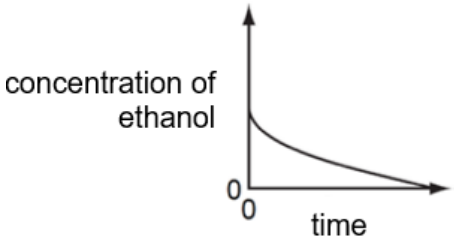
A



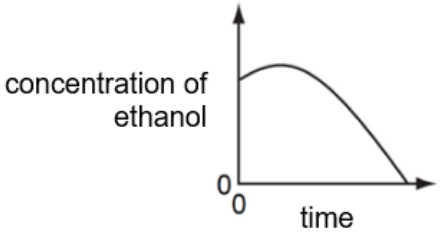
B



C



D



4 The ion X^{2+} has three complete shells of electrons.

this is **after losing 2 electrons**, so X atom has 4 shells initially

What is X?

A calcium

B magnesium

C potassium

D strontium

5 A crystal of sodium chloride (ionic compound) is held together by

A covalent bonds.

B positive ions in a 'sea of electrons'. refers to structure of metals

C the attraction of oppositely charged ions.

D shared pairs of electrons.

6 Some students wrote three statements about the bonding in a molecule of carbon dioxide, CO_2.

1 A carbon atom has 4 outer electrons so all outer electrons are involved in bonding.

2 A carbon atom has 6 outer electrons so 2 outer electrons are not involved in bonding.

3 A carbon atom shares electrons with two oxygen atoms.

Which statement(s) about bonding in carbon dioxide is/are correct?

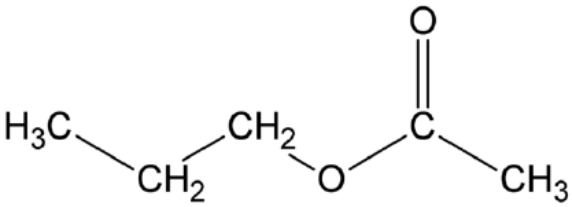
A 1 only

B 2 only

C 1 and 3

D 2 and 3

7 The diagram shows an organic molecule propyl ethanoate.



How many pairs of electrons are used in bonding in the molecule?

A 1

B 7

C 14

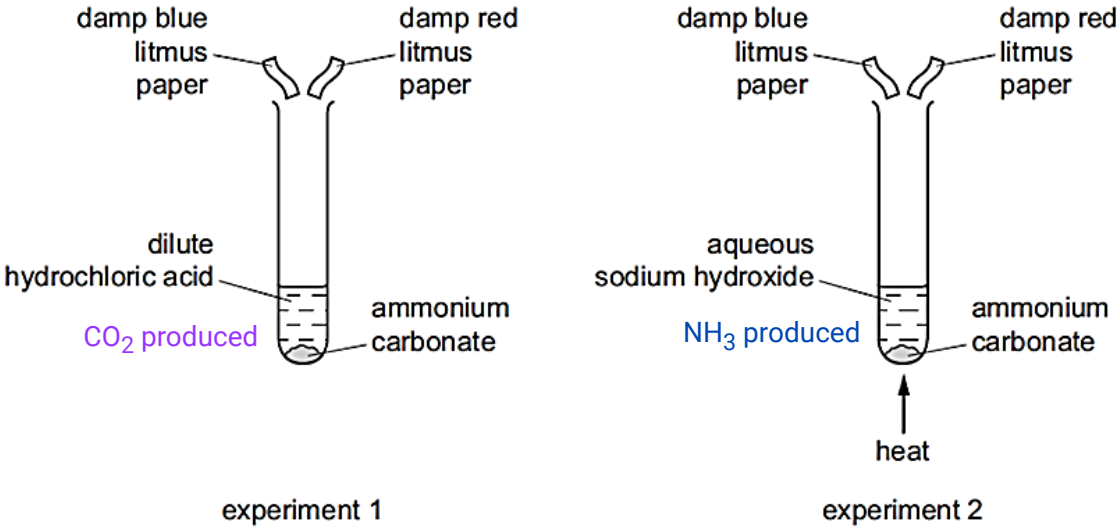
D 17

8 Two experiments were carried out.

In experiment 1, ammonium carbonate was reacted with dilute hydrochloric acid.

In experiment 2, ammonium carbonate was heated with aqueous sodium hydroxide.

In each experiment, the gas evolved was tested with damp blue litmus paper and damp red litmus paper.



Which row correctly shows the colour of both pieces of litmus paper at the end of each experiment?

	experiment 1	experiment 2
A	blue	blue
B	blue	red
C	red	blue
D	red	red

9 A solution of ethanoic acid, CH_3COOH, has a concentration of 2 mol/dm^3.

M_r of CH_3COOH = 60

Which statement about this solution is correct?

A 20g of ethanoic acid is dissolved in 10 cm^3 of water.

B 30g of ethanoic acid is dissolved in 250 cm^3 of water.

C 60g of ethanoic acid is dissolved in 1 dm^3 of water.

D 120g of ethanoic acid is dissolved in 2 dm^3 of water.

10 Solutions of a halogen and a sodium halide are mixed.

Which mixture darkens in colour because a reaction occurs?

A bromine and sodium chloride

B bromine and sodium fluoride

C chlorine and sodium fluoride

D chlorine and sodium iodide

Chlorine is **more reactive** than iodine, thus is **able to displace** iodine (brown solution / black ppt) from sodium iodide.

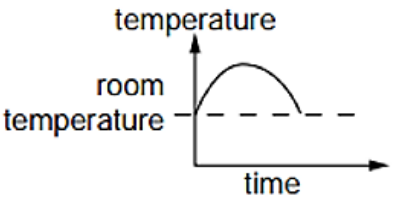
11 Dissolving ammonium nitrate in water is an endothermic reaction.

heat taken in **from surroundings**, temperature of **surroundings** drop

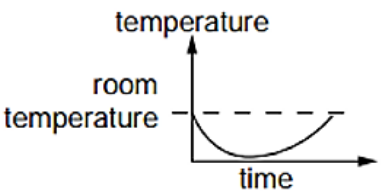
Which graph shows how the temperature changes over time as ammonium nitrate is added to water and the solution is left to stand?

(process taking in heat has stopped, temperature goes back to room temperature)

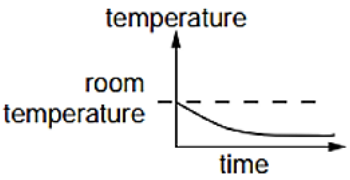
A



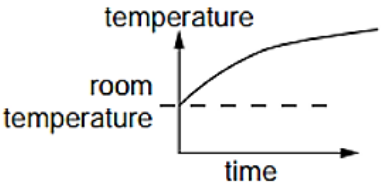
B



C



D



12 Aqueous potassium iodide and acidified potassium manganate(VII) were added separately to separate samples of hydrogen peroxide.

The observations are summarised in the table.

reagent added to hydrogen peroxide	observations
aqueous potassium iodide RA	aqueous potassium iodide turns from colourless to brown KI oxidised
acidified potassium manganate (VII) OA	acidified potassium manganate (VII) turns from purple to colourless

$KMnO_4$ reduced

Which set of properties is correct for the above observations?

	aqueous potassium iodide	acidified potassium manganate (VII)
A	oxidising agent	reducing agent
B	oxidising agent	oxidising agent
C	reducing agent	oxidising agent
D	reducing agent	reducing agent

H_2O_2 is **both** a reducing agent and an oxidising agent.

13 Which change in conditions increases the energy of particles in a reaction?

A increase in concentration

B increase in pressure

C increase in temperature

D presence of catalyst

14 Which statements about the trends across a period of the Periodic Table are correct?

Trend: From left to right (across a Period) the elements becomes **less metallic** (or more non-metallic) in character.

1 Aluminium is more metallic than sodium.

2 Calcium is more metallic than arsenic.

3 Boron is more metallic than lithium.

4 Magnesium is more metallic than silicon.

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

15 Metal X is extracted from its oxide by heating the oxide with carbon. (Metal X is not a reactive metal)

Zinc reacts slowly with steam and metal X reacts very slowly with steam. (X is less reactive than zinc)

What is the order of reactivity of the above metals to sodium and copper?

	least reactive → most reactive			
A	sodium	metal X	zinc	copper
B	sodium	zinc	metal X	copper
C	copper	zinc	metal X	sodium
D	copper	metal X	zinc	sodium

16 Which statements about homologous series are correct?

1 All members have similar chemical properties.

2 All members have similar physical properties. INCORRECT. "slight gradual change in phy prop"

3 All members have the same molecular mass. INCORRECT. mass increases by 14 (a CH_2 unit) for each successive member

4 All members have the same functional group.

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

17 When ethanol (C_2H_5OH) is left standing in the air (O_2) for some time, it becomes acidic. (organic acid CH_3COOH)

Which equation represents this change?

A $CH_3CH_2OH + CO \rightarrow CH_3CH_2CO_2H$

B $CH_3CH_2OH + O_2 \rightarrow CH_3CO_2H + H_2O$

C $CH_3CH_2OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$

D $2CH_3CH_2OH + O_2 \rightarrow 2CH_3CO_2H + 2H_2$ no metal used as reactant, cannot be H_2 produced

18 The complete combustion of 20 cm^3 of a gaseous alkane, Z, requires 130 cm^3 of oxygen. Both volumes are measured at room temperature and pressure.

What could be the identity of Z?

A butane $2C_4H_{10}(g) + 13O_2(g) \rightarrow 8CO_2(g) + 10H_2O(l)$

B ethane

C methane

D propane

19 What statement about propanoic acid (C_2H_5COOH) is correct?

A It has a molecular formula, C_3H_7COOH.

B It is formed when propanol reacts with acidified potassium manganate(VII).

C It reacts with copper to produce hydrogen gas. Copper metal is not reactive, does not react with acids.

D It turns red litmus paper blue. With acids, should be **blue** litmus turning **red**.

20 In a reaction, 1000 molecules of $CH_2=CH_2$ react to form a single molecule X under certain conditions. monomers, contain C=C double bond; polymer

Which row describe the conditions and the terms for $CH_2=CH_2$ and X?

	conditions	$CH_2=CH_2$	X
A	high temperature and pressure	monomer	polymer
B	high temperature and pressure	polymer	monomer
C	low temperature and pressure	monomer	polymer
D	low temperature and pressure	polymer	monomer

DATA SHEET

Colours of Some Common Metal Hydroxides

aluminium hydroxide	white
calcium hydroxide	white
copper(II) hydroxide	light blue
iron(II) hydroxide	green
iron(III) hydroxide	red-brown
zinc hydroxide	white

The Periodic Table of Elements

Group																	
1	2											13	14	15	16	17	18
							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	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	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.).

The Avogadro constant, $L = 6.02 \times 10^{23}\ mol^{-1}$.