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CONVENT OF THE HOLY INFANT JESUS SECONDARY
Preliminary Examination in preparation for
the General Certificate of Education Ordinary Level 2025

CANDIDATE NAME			
CLASS		REGISTER NUMBER	

SCIENCE (CHEMISTRY, BIOLOGY) 5088/01

Paper 1 Multiple Choice **3 September 2025**

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.

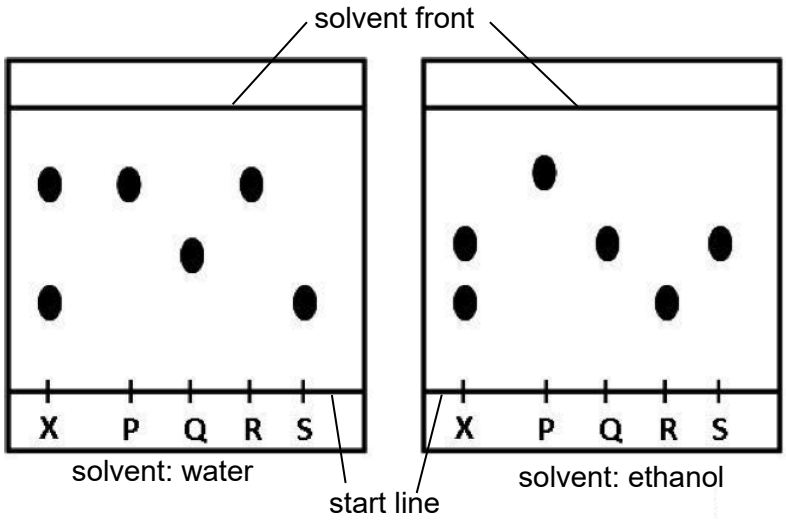
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.

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 An unknown substance X and four known substances P, Q, R and S, were analysed by chromatography using two different solvents, water and ethanol.

The resulting chromatograms are shown below.



Which substances are found in X?

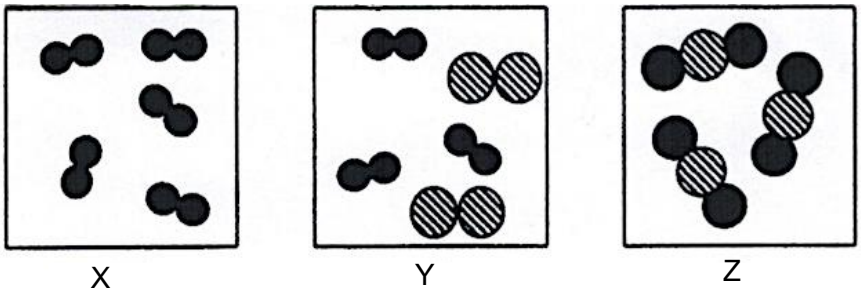
A P and R only

B R and S only

C P, R and S only

D P, Q, R and S

2 The diagrams show the arrangement of particles in the substances, X, Y and Z.



Which row correctly describes X, Y and Z?

	X	Y	Z
A	compound	element	mixture
B	element	compound	mixture
C	element	mixture	compound
D	mixture	compound	element

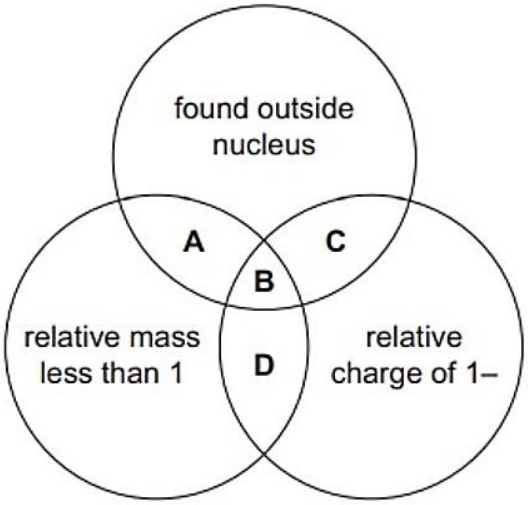
3 Bromine is a liquid at 20 °C.

What could be the melting point and boiling point for bromine?

	melting point / °C	boiling point / °C
A	−22	−3
B	−8	−33
C	−7	59
D	25	105

4 The diagram shows some properties of particles in an atom.

To which labelled part of the diagram does electron belong?



5 An atom forms an ion with a charge of 2+ and the electronic configuration of 2,8,8.

What is the proton number of the atom?

A 16

B 17

C 19

D 20

[Turn over

6 Element P has *n* protons.
Element Q has (*n* – 3) protons and can achieve a stable electronic configuration by either sharing or accepting two electrons.

What is the compound formed when element P reacts with element Q?

A a covalent compound, PQ_2

B a covalent compound, P_2Q

C an ionic compound, PQ_2

D an ionic compound, P_2Q

7 How many ions are there in 13.6 g of zinc chloride?

A 1.2×10^{23}

B 1.8×10^{23}

C 1.2×10^{24}

D 1.8×10^{24}

8 Hydrogen is produced in all reactions shown.

Which reaction produces the greatest volume of hydrogen, measured at room temperature and pressure.

A 1.4 g of carbon reacts with excess steam.

$$C + H_2O \rightarrow H_2 + CO$$

B 2.4g calcium hydride reacts with excess water.

$$CaH_2 + 2H_2O \rightarrow Ca(OH)_2 + 2H_2$$

C 4.0 g calcium reacts with excess dilute hydrochloric acid.

$$Ca + 2HCl \rightarrow CaCl_2 + H_2$$

D 50.0 cm^3 of 2.0 mol/dm^3 of sulfuric acid reacts with excess zinc.

$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$

9 The table shows the observations of some reactions of an oxide, XO, where X is an unknown element.

reaction of XO with sodium hydroxide	reaction of XO with hydrochloric acid
reaction occurred	reaction occurred

What is the identity of element X?

A carbon

B lead

C magnesium

D sulfur

10 The table shows information of some pH indicators.

indicators	pH					
	2	3	4	5	6	7
methyl orange	red		yellow			
methyl red	red				yellow	
bromothymol blue	yellow					blue

An unknown solution appears yellow when all three indicators are added to this solution.

What is the pH of the unknown solution?

A 4

B 5

C 6

D 7

11 In which reaction does the oxidation state of iron remain unchanged?

A $C + FeO \rightarrow CO + Fe$

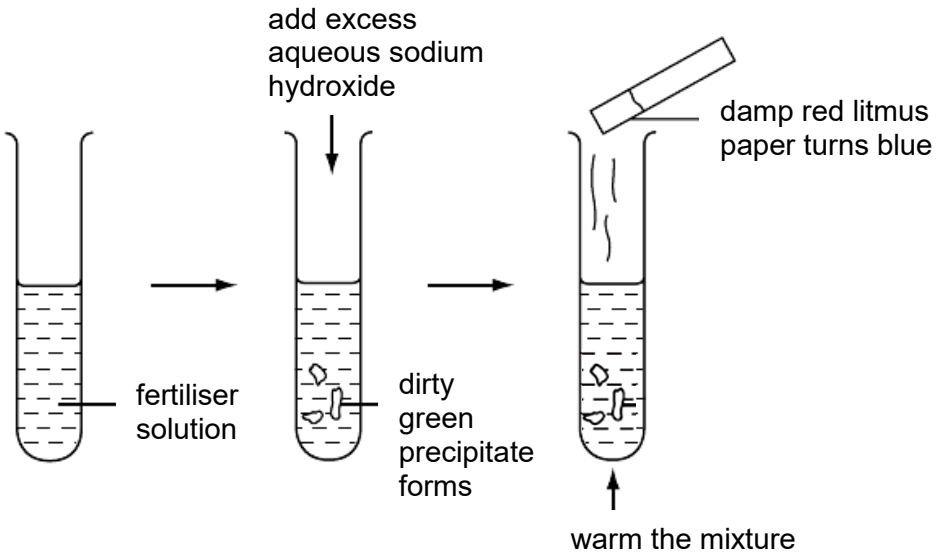
B $PbO + Fe \rightarrow Pb + FeO$

C $2FeCl_2 + Cl_2 \rightarrow 2FeCl_3$

D $Fe_2O_3 + 6HCl \rightarrow 2FeCl_3 + 3H_2O$

[Turn over

12 A solution of fertiliser was tested as shown.



What are the ions present in the fertiliser solution?

A Fe^{3+} and SO_4^{2-}

B Fe^{2+} and NO_3^-

C NH_4^+ and NO_3^-

D NH_4^+ and Fe^{2+}

13 Period 3 of the Periodic Table contains the elements from sodium to argon.

Which statement is correct for the trend from left to right across Period 3?

A The elements show a decrease in electrical conductivity.

B The elements have an increasing melting point.

C The elements have an increasing number of electron shells.

D The elements react more violently with water.

14 Which statement about the element bromine is correct?

A It displaces chlorine from aqueous sodium chloride.

B It has a lower melting point than fluorine.

C It is a diatomic metal.

D It is lighter in colour than iodine.

15 A student added dilute sodium hydroxide to dilute nitric acid and recorded an increase in the temperature of the mixture.

Which row describes the reaction?

	type of reaction	energy change
A	endothermic	energy given out to surroundings
B	endothermic	energy taken in from surroundings
C	exothermic	energy given out to surroundings
D	exothermic	energy taken in from surroundings

16 An experiment was conducted to investigate the rate of reaction when calcium carbonate is reacted with dilute hydrochloric acid. The procedure is as shown.

- Place 50.0 cm^3 of dilute hydrochloric acid in a conical flask.
- Add a known volume of water to the conical flask.
- Heat the mixture in the conical flask to the required temperature.
- Add 1.0 g of calcium carbonate to the conical flask.
- Measure the time taken for the reaction to complete.

What volume of water and temperature will allow the reaction to complete in the shortest time?

	volume of water added / cm^3	temperature / °C
A	10	30
B	10	50
C	40	30
D	40	50

17 A sample of petroleum is separated into three fractions, X, Y, and Z, using fractional distillation.

Some properties of X, Y and Z are listed.

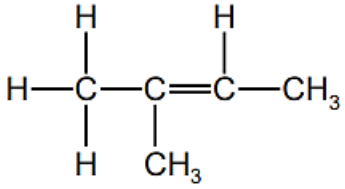
- X is more viscous than Z.
- Y has a higher boiling point than X.

Which row correctly identifies the fraction with the longest carbon chain and highest volatility?

	longest carbon chain	most volatile
A	Y	X
B	Y	Z
C	Z	X
D	Z	Y

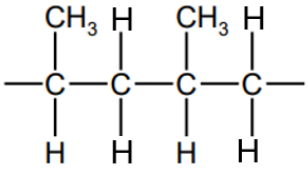
[Turn over

18 The structure of a monomer is shown.

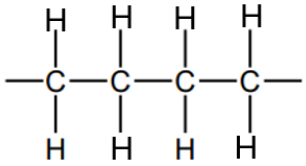


Which structure shows part of the polymer chain formed from **two** molecules of the monomer?

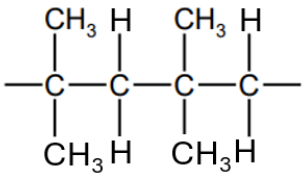
A



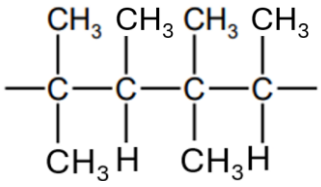
B



C



D



19 Which row describes the methods of recycling plastics correctly?

	physical method	chemical method
A	burning plastic to generate electricity	cracking plastics into fuel
B	burning plastic to generate electricity	compressing plastics into bricks
C	melting plastic into pellets for reuse	cracking plastics into fuel
D	melting plastic into pellets for reuse	compressing plastics into bricks

20 Which row identifies a natural source and an adverse effect of oxides of nitrogen?

	source	adverse effect
A	decay of plant and animal matters	acid rain
B	decay of plant and animal matters	global warming
C	lightning activities	acid rain
D	lightning activities	global warming

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