

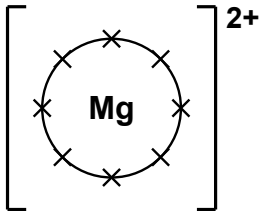
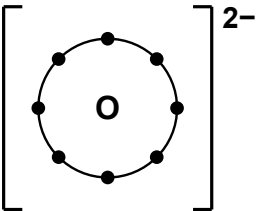
Science (Chemistry) 5088 – Set V
Answer Scheme

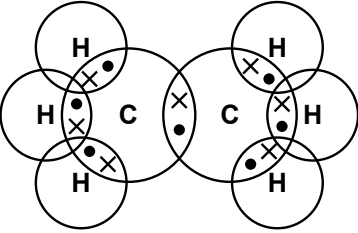
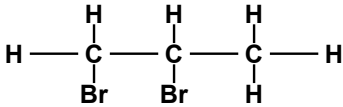
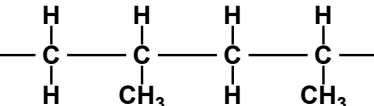
Paper 1

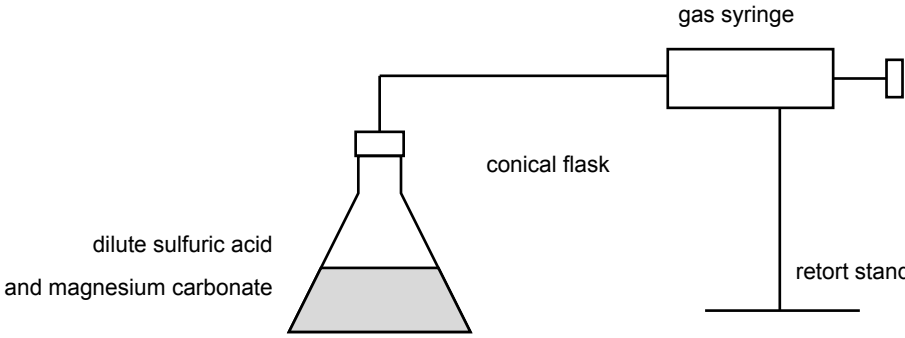
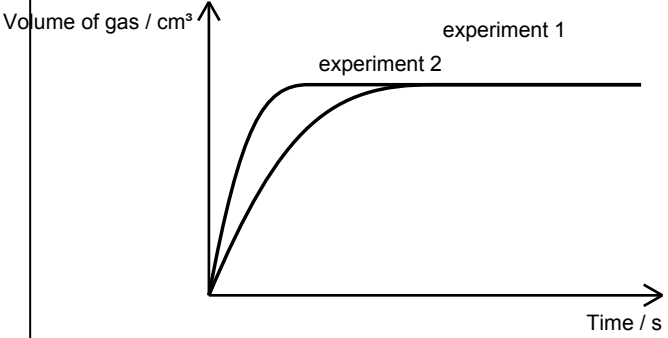
1	2	3	4	5
C	C	A	D	B
6	7	8	9	10
C	B	A	A	B
11	12	13	14	15
A	D	D	B	D
16	17	18	19	20
D	B	A	B	D

Paper 3

1	(a)	carbon monoxide	1
	(b)	sulfur dioxide	1
	(c)	aluminium oxide	1
	(d)	sulfur	1
	(e)	calcium hydroxide	1
	(f)	methane	1
			Total: 6
2	(a)	Helium is used in (air) balloons / undersea breathing apparatus.	1
	(b)	Radon has 8 outer shell electrons / complete/ full outer shell of electrons.	1
	(c)(i)	Both isotopes have 86 protons / 86 electrons.	1
	(c)(ii)	Radon-222 has two more neutrons than radon-220 / radon-220 has 134 neutrons and radon-222 has 136 neutrons.	1
	(d)(i)	Volume of sample increases. Particles move faster / particles move further apart.	1 1
	(d)(ii)	moles = $21 / 24 = 0.875$ mass = 0.875×20 = 17.5 (g)	1 1
			Total: 8
3	(a)	Molten magnesium oxide has mobile ions which act as charge carriers. Ions in solid magnesium oxide are not able to move freely.	1 1
	(b)	10e; 16 12p; 12n	-1 for each mistake

	(c)	 	1 for each ion
			Total: 7
4	(a)(i)	aqueous ammonia	1
	(a)(ii)	hydrochloric acid	1
	(a)(iii)	ammonium chloride	1
	(a)(iv)	silver chloride	1
	(b)	$\text{NH}_4\text{Cl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{NH}_3$ 1 – correct formulae 1 – correct balanced equation	2
	(c)	Filter the mixture, Wash with deionised water and dry the residue N.	1 1
			Total: 8
5	(a)	fluorine	1
	(b)	Chlorine has 3 electron shells.	1
	(c)(i)	$\text{Cl}_2 + 2\text{I}^- \rightarrow 2\text{Cl}^- + \text{I}_2$	1
	(c)(ii)	Colourless (solution) turned brown.	1
	(d)	The melting point of Group 17 elements increases down the group.	1
			Total: 5
6	(a)	A <u>mixture</u> of a <u>metal</u> and <u>one or more other elements</u> .	1
	(b)	<u>Different sized</u> atoms <u>disrupt the regular arrangement of atoms in a pure metal</u> . A greater force is required for layers of <u>atoms</u> to slide over one another.	1 1
	(c)	CO is a reducing agent. <u>Fe_2O_3 was reduced as:</u> <u>oxidation state of Fe decreased from +3 in Fe_2O_3 to 0 in Fe.</u> OR <u>Fe_2O_3 loses oxygen to form Fe atoms.</u> OR <u>each Fe^{3+} in Fe_2O_3 gains 3 electrons to form Fe atoms.</u>	1 1
			Total: 5
7	(a)	Covalent bond	1

	(b)		-1 for each mistake
	(c)	The boiling points of the molecules <u>increase</u> as the molecular size of the alkanes <u>increases</u> .	1
	(d)	C ₇ H ₁₆	1
	(e)	Liquid	1
			Total: 6
8	(a)	Boiling points	1
	(b)(i)	Any one: same functional group / similar chemical property / each successive member increases by a -CH ₂ - group / gradual change in physical property	1
	(b)(ii)	C _n H _{2n}	1
	(b)(iii)		1
	(b)(iv)	 1 mark if not full structural formula -1 m for each mistake	2
	(b)(v)	Poly(propene) is non-biodegradable, will continue to pollute the land / sea for a long time.	1
	(c)(i)	Yeast + 37 °C + absence of O ₂ 3 conditions – 2 marks 2 conditions – 1 mark	2
	(c)(ii)	Bioethanol can be replaced within a short period of time after being used up. Sugarcane plants can be replanted.	1
			Total: 10
9	(a)(i)	hydrogen	1
	(a)(ii)	OH ⁻	1
	(a)(iii)	Add a few drops of Universal Indicator to 2 cm ³ of aqueous calcium hydroxide. The indicator turns from green to purple. The pH of aqueous calcium hydroxide is 14.	1 1

	(b)(i)	0.150×0.25 $= 0.0375$	1 1
	(b)(ii)	$0.0375 \times 2 = 0.075$	1
	(c)	Rubidium reacts very violently with cold water. Reaction is explosive and rubidium catches fire. Calcium reacts readily with cold water. No flame is observed. Both reactions produce effervescence. Both rubidium and calcium react to form a colourless solution.	1 1 1 1
			Total: 10
10	(a)	 1 mark- drawing of apparatus set-up 1 mark- labelling	2
	(b)	Experiments 1 and 3	1
	(c)	An increase in temperature will result in an <u>increase in kinetic energy of reacting particles.</u> / <u>The particles move faster.</u> Hence, this increases the <u>frequency of effective collisions</u> between particles, resulting in a higher rate of reaction.	1 1
	(d)		1

	(e)	Measure a fixed volume (25.0 cm³) of dilute sulfuric acid and place it in a beaker. Measure the <u>initial temperature</u> of the acid using a thermometer. Add a known mass of magnesium carbonate (5g) to the acid, measure the <u>temperature after the reaction is completed</u>. Subtract the initial temperature from the final temperature of the mixture and calculate the <u>temperature change</u>. If temperature increases, the reaction is exothermic / If the temperature decreases, the reaction is endothermic.	1 1 1 1
			Total: 10