Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
7	1	*(a)*			3	sedimentation – removes large particles/objects (1) filtration – removes smaller particles (1) chlorination – kills bacteria (1)			
		(b)			2	removal of salt from seawater (1) distillation (1)	osmosis		

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
8	2	*(a)*	(i)		3	burns - lilac flame (1R) Reserved mark • floats • moves • melts / spherical shape • effervesces / fizzes / bubbles • spits / sparks / pops any two for (1) each up to 2 max		dissolves disappears produces hydrogen	red / yellow / blue / green flame
			(ii)		1	the piece of potassium could have been too big / could have been too little water / water could have been hot / potassium could have stuck to the side of trough			
		(b)			2	$2KOH + H_2$ (2) (1) for KOH if any errors			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
9	3	*(a)*			3	David – mean of all four values (54 ÷ 4 = 13.5) (1) Haf – mean of three values, with indication which three were selected (1) Haf's value is better as she used repeatable values only / discarded the value that appears to be suspect (1)			
		(b)			1	A		8	
		(c)			2	B (1) some hardness has been removed by boiling but some remains (1)			
		(d)			1	calcium (ion) / magnesium (ion)	Ca^{2+} / Mg^{2+}		

Question Number			
FT	HT	Mark	Answer
10	4	6 QWC	Indicative content • element has a mass number of 35 and atomic number of 17 • 17 protons given by atomic number; must have same number of electrons because atoms are neutral • 17 electrons arranged in shells; electronic structure 2, 8, 7 • element is in Period 3; number of occupied electron shells • element is in Group 7; number of electrons in the outer shell • element E is chlorine • number of neutrons is 18; difference between mass number and atomic number 5-6 marks: The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. 3-4 marks: The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. 1-2 marks: The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. 0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.

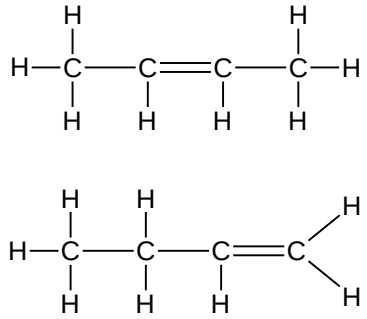
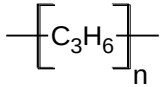
Chemistry 2 – Higher tier only questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	5	*(a)*			2	coal dust has a much greater surface are than lumps of coal (1) greater chance of collision / more collisions per unit time (1)		faster reaction	
		(b)			2	1 day - correct answer only (2) if answer incorrect (1) for any indication of correct working e.g. from 5-15°C halves time from 8 days to 4 days			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
	6	*(a)*			2	first mark for sensible suggestion with second mark for linked point/explanation e.g. use more calcium oxide (1) more heat would be released on reaction (1) or use smaller pieces of calcium oxide (1) so that reaction occurs more quickly (1)	less water / better insulation on outer wall of can / thinner metal in inner wall	less food	
		(b)			2	bond making releases energy and bond breaking absorbs energy (1) reactions are exothermic if more energy is released than is absorbed (1) both marks could be gained by one statement e.g. reactions are exothermic if more energy is released in making bonds than is absorbed in breaking bonds (2)			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	7	*(a)*	(i)		3	diagrammatic representation showing clearly two Na atoms losing 1 outer electron each (1) one O atom gaining 2 electrons (1) Na^+ and O^{2-} (both needed) (1) there must be no ambiguity e.g. electrons cannot be on atoms and ions at the same time			
			(ii)		1	sodium ion 2, 8 oxide ion 2, 8 both needed			
		(b)			3	simple molecular (1) weak bonds between molecules (1) only a small amount of energy needed to break them (1)	simple covalent	covalent	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	8	*(a)*			3	$Fe + Br_2$ (1) $FeBr_3$ (1) 2 3 2 (1) balancing mark only awarded if all formulae are correct			
		(b)			2	silver nitrate (solution) (1) cream / off-white precipitate (1)			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	9	*(a)*			1	either of following 	correct structure for 2-methylpropene		
		(b)			4	double bonds open (1R) Reserved mark • propene molecules join together / form chains (1) • (addition) polymerisation (1) • repeat unit  (1) • any 2 of high temp / high pressure / catalyst (1) any 3 up to 3 max			condensation polymerisation

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	10	*(a)*			3	$M_r(Cu_2S) = 64 + 64 + 32 = 160$ (1) 1 mol of Cu_2S produces 2 mol of Cu or 160 tonnes of Cu_2S produces 128 tonnes of Cu (1) 20.5 tonnes of Cu_2S produces $\frac{128}{160} \times 20.5$ = 16.4 tonnes of Cu (1) error carried forward possible correct answer only (3)			
		(b)			2	4.1 tonnes of 'missing product' (1) $\frac{4.1}{16.4} \times 100 = 25\,\%$ (1) error carried forward from *(a)* correct answer only (2)			

Question Number			
FT	HT	Mark	Answer
	11	6 QWC	Indicative content • correct order of reactivity, i.e. chlorine > bromine > iodine • observations relating to the reactions of halogens with iron, e.g. iron glows more brightly in chlorine than bromine • displacement reactions, e.g. chlorine reacts with potassium bromide to give bromine • appropriate word/symbol equations 5-6 marks: The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. 3-4 marks: The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. 1-2 marks: The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. 0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.