

## Common questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
7	1	(a)			2	liquid (1) must be correct to award second mark  melting point below <b>and</b> boiling point above room temperature / 20°C (1)			
		(b)			2	less reactive down the group (1)  no / very slow reaction (1)	converse		
		(c)			1	$2\text{Fe} + 3\text{F}_2 \rightarrow 2\text{FeF}_3$			
		(d)	(i)		1	$2\text{Cl}^- - 2\text{e}^- \rightarrow \text{Cl}_2$			
			(ii)		1	concentration of iodide in seawater is too low / very low	electricity too expensive		
			(iii)		1	toxic / kills bacteria		gets rid of bacteria	

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8	2	(a)	(i)		2	iron(III) oxide + aluminium → iron + aluminium oxide  (1) for <b>both</b> reactants (1) for <b>both</b> products	correct chemical equation	powder	magnesium as reactant
			(ii)		2	aluminium more reactive than iron (1) must be correct to award second mark  takes oxygen from iron / reduces iron(III) oxide (1)			
			(iii)		1	no reaction			
		(b)	(i)		3	iron ore – provides the iron (1)  coke – reduces iron oxide / fuel / burns to produce heat / forms carbon monoxide (1)  limestone – removes impurities (1)		makes iron  source of heat  forms slag	
			(ii)	I	1	$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$			
				II	1	loss of oxygen / gain of electrons			

Question Number			
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9	3	6	<p><b>Indicative content:</b> e.g. <b>aluminium:</b> low density – used to build aircraft; good heat conductor – saucepans; good electrical conductor and low density – overhead power cables etc.</p> <p><b>copper:</b> good electrical conductor – electrical wires; good heat conductor – saucepan bases etc.</p> <p><b>titanium:</b> strong with low density – rotors on helicopters, hip replacements etc.</p> <p>credit can be awarded for correct uses and properties of metals not described in the specification</p> <p><b>5–6 marks:</b> 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.</p> <p><b>3–4 marks:</b> 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.</p> <p><b>1–2 marks:</b> 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.</p> <p><b>0 marks:</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

## Higher Tier only questions

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
	4	(a)			2	atomic masses (1)  reactions / properties of elements (1)		'relative' mass number	
		(b)			2	similarity – groups / periods (1)  difference – gaps / two elements in some blocks / some elements in different groups / no noble gases or transition elements in early table (1)	no atomic number in early table / named examples of elements that have changed position	properties columns / rows	
		(c)			2	He <div style="display: flex; justify-content: space-around; align-items: center;"><div>3</div><div>2</div><div>4</div></div> all four correct for (2) any 2 for (1)			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
	5	(a)	(i)		3	copper(II) carbonate (1) copper(II) nitrate (1) sodium hydroxide (1)	formulae		
			(ii)		4	<b>A</b> – hydrogen (1) must be correct to award second mark pop with lighted splint (1)  <b>D</b> – carbon dioxide (1) must be correct to award second mark limewater turns milky (1)	H <sub>2</sub>  CO <sub>2</sub>	H 'pop test'	
		(b)	(i)		1	Na <sub>2</sub> SO <sub>4</sub>			
			(ii)		2	heat until half volume / remove some water (1) leave to form crystals (1)	evaporate	filtration	to dryness
		(c)			1	$\text{Fe}_2\text{O}_3 + 2\text{H}_3\text{PO}_4 \rightarrow 2\text{FePO}_4 + 3\text{H}_2\text{O}$			

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	6	(a)	(i)		2	Cu ions are positively charged (1) must be correct to award second mark  opposite charges attract / attracted to negative electrode (1)	$\text{Cu}^{2+}$		
			(ii)		1	$\text{Cu}^{2+} + 2\text{e}^{-} \rightarrow \text{Cu}$			
		(b)	(i)		1	0.20			
			(ii)		1	45 %  error carried forward (ecf) possible from (i)			
			(iii)		2	0.26 (1)  increase of approximately 0.02 g per 1.0 V / last 3 results increase by 0.02 g per 1.0V (1)  ecf possible from (i)			

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	7	(a)			2	fractions have different length of hydrocarbon / chains / relative mass / $M_r$ (1) must be correct to award second mark  which have different boiling points (1)			
		(b)			4	conditions – heat / catalyst (1)  explanation <ul style="list-style-type: none"><li>breaks down large / less useful fractions into smaller more useful ones</li><li>increases amount of fuels obtained from the crude oil</li><li>produces raw materials or monomers for use in making plastics</li><li>less waste / more profit</li></ul> any three for (1) each up to max 3	break bonds between C atoms  products more useful than reactants		

Question Number			
FT	HT	Mark	Answer
	8	6	<p><b>Indicative content:</b></p> <p>reasons for:           strengthens tooth enamel and prevents tooth decay</p> <p>reasons against:      causes fluorosis in large concentrations graph shows no further benefit above a concentration of 0.9 but increasing occurrence of fluorosis after 0.7</p> <p>conclusion:            should add from 0.4-0.7 as reduces DMFT but no increase in fluorosis</p> <p><b>5–6 marks:</b> 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.</p> <p><b>3–4 marks:</b> 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.</p> <p><b>1–2 marks:</b> 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.</p> <p><b>0 marks:</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>