

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
7	1	(a)		1	Br <sub>2</sub>			
		(b)		2	gas at room temperature therefore bp < 20 °C (1) above the mp / -101 °C (1)			
		(c)		1	treatment of water supply or swimming pool / sterilise water / toilet cleaners / bleach / disinfectant		clean water / water supply – needs to be qualified	poison gas
		(d)		2	gas (at room temperature)  pale (yellow) colour / coloured  acceptable predicted value for the melting point i.e. < -101 °C  any two for (1) each	any colour       'diatomic'	F <sub>2</sub>      low melting point	colourless

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8	2	(a)	(i)		1	carbon, sulfur and hydrogen	C, S and H	H <sub>2</sub> oxygen	
			(ii)		1	(fuels that) cannot be replaced (when they are used up) / (fuels that) will run out		'limited amount' needs qualification	
		(b)	(i)		1	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$			
			(ii)		1	produces a '(squeaky) pop' noise when tested with a lighted splint		'pop test'	
			(iii)		2	(large amount of) electricity required to produce hydrogen (1) (storage problem due to its) explosive nature (1)	availability of hydrogen e.g. lack of service stations for vehicles	highly flammable / unsafe / unstable / expensive	

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9	3	(a)		2	over millions of years (1)  remains of marine organisms (1)	missing 'marine' reference if pressure / heat mentioned		
		(b)	(i)	2	as the molecule size increases - the boiling point (range) increases / (colour) darkens / becomes more viscous / more difficult to burn / flame becomes more smoky  any two for (1) each	inverse statement		
			(ii)	2	temperature lower during the winter (1)  propane easier to ignite (1)  butane becomes liquid at low temperature / difficult or problems for the butane to flow (1)  any two for (1) each			

Question Number		Mark	
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10	4	6	<p>Indicative content: a description of the reaction between the carbonate and the acid – apparatus named, effervescence, exothermic, the formation of blue coloured copper sulfate solution and the addition of excess of the copper carbonate. The removal of the excess copper carbonate by filtration. Obtaining the crystals by evaporation. Either allowing the solution to evaporate at room temperature or by heating the solution and allowing the remaining solution to evaporate naturally to dryness. Credit to be given for word/symbol equation.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

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	5				4	$\text{NH}_4^+$ (1) $\text{Li}_2\text{SO}_4$ (1) $\text{Pb}(\text{NO}_3)_2$ (1) $\text{HCO}_3^-$ (1)	$\text{Li}^+ \text{SO}_4^{2-}$ $\text{Pb}^{2+} (\text{NO}_3^-)_2$		

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	(a)	(i)		1	sodium, magnesium and aluminium (ignore 'silicon')	Na, Mg and Al		
	6		(ii)		1	silicon	Si		
			(iii)		1	both gases (at room temperature)		very low density	
			(iv)		1	density of the metals increases across the period			
		(b)			2	the evidence supports the statement for P, Cl, Ar and/or S, Cl, Ar (1)  P is lower than S/P or S does not follow the trend (1)  need to look at data for other periods (1)  any two for (1) each	if Si is included in their list		

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
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	7	(a)		2	reaction takes place since iron is higher in the series / more reactive than copper (1)  brown solid formed / solution becomes colourless / decolourises (1)			
		(b)		2	reaction takes place since magnesium is higher in the series than hydrogen (1)  effervescence / bubbling / temperature rise / exothermic (1)	magnesium disappears		
		(c)		2	no reaction takes place (1)  aluminium is higher in the series / more reactive than carbon (1)	no displacement		

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	8	(a)		1	allows a valid comparison of the two volumes	apparatus was initially at room temperature	health and safety answers	
		(b)	(i)	2	volume of oxygen = $50 - 41 = 9$ (1) $\% \text{ of oxygen} = \frac{9}{50} \times 100 = 18 \%$ (1) - correct answer only (2)			
			(ii)	1	some unreacted oxygen still left in the air / the air has not been passed over the copper sufficient number of times / not enough copper to remove all the oxygen / some of the copper unreacted			
		(c)	(i)	1	copper oxide	CuO		
			(ii)	1	increase in mass since the solid or copper has joined or reacted with oxygen			
		(d)	(i)	1	nitrogen	N <sub>2</sub>	N	
			(ii)	1	argon	Ar		



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	9	(a)			1	allows the ions to be mobile / move		allows electricity to flow	
		(b)			1	$2\text{Br}^- - 2\text{e}^- \rightarrow \text{Br}_2$			
		(c)	(i)		1	lead ions would gain electrons			
			(ii)		1	shiny or grey substance		lead – needs qualifying	
			(iii)		2	lead metal formed would link the two electrodes (1)  lead/metals conduct electricity (1)			

Question Number		Mark	
FT	HT		
	10	6	<p>Indicative content: a description of photosynthesis and respiration producing and removing oxygen and removing and producing carbon dioxide respectively. Discussing combustion and how oxygen is reduced to produce carbon dioxide during this process. Discussing deforestation reduces the number of plants available to produce oxygen and to reduce the amount of carbon dioxide in the atmosphere which therefore increases the percentage of carbon dioxide in the air leading to global warming.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.</p>