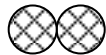



GCSE SCIENCE - CHEMISTRY (NEW)

C1 Mark Scheme - January 2013

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
1		(a)	(i)	1	aluminium and sodium (both needed)	Al and Na		
			(ii)	1	nitrogen dioxide and water (both need)	NO ₂ and H ₂ O		
			(iii)	1	crude oil			
		(b)	(i)	1	A			
			(ii)	I	1 			
				II	1 			
			(iii)	I	1			
				II	1			
					6			

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
2		(a)		1	pH value of 1			
		(b)		1	nitric, hydrochloric etc	HNO ₃ , HCl etc		
		(c)		1	carbon dioxide	CO ₂		
		(d)		2	the gas is denser / heavier than air (1) does not support combustion or burning / extinguishes or puts out a flame (1)	gas doesn't burn / is not flammable	flame goes out – unless qualified	

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)		1	gives heat / energy to the mixture	burns very hot	ignites / flammable	
		(b)	(i)	1	aluminium oxide + iron	$\text{Al}_2\text{O}_3 + \text{Fe}$ – ignore balancing		
			(ii)	1	iron oxide is reduced since oxygen is removed / lost			
		(c)	(i)	1	$\text{TiCl}_4 + 4\text{Na} \longrightarrow \text{Ti} + 4\text{NaCl}$			
			(ii)	1	titanium is less reactive than sodium		titanium is unreactive / not very reactive	
			(iii)	1	prevent the sodium reacting with air or oxygen / stops the sodium burning / argon not reactive / inert			
			(iv)	1	sodium is very expensive / lots of heat or energy needed	needs high temperature to work		

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
4		(a)		2	increase (1) carbon dioxide given out during breathing / respiration (1)		breathing	
		(b)		2	decrease (1) carbon dioxide removed during photosynthesis / plants take in carbon dioxide (1)			
		(c)		2	increase (1) carbon dioxide given out during combustion / burning (of fuels) (1)			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
5					3	sodium bromide (1) hydrogen, sulfur and oxygen (1) K ₂ O (1)		H, S and O	

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
6		(a)		1	copper sulfate (solution)	CuSO ₄		
		(b)		1	anode			
		(c)	(i)	1	0.8			
			(ii)	3	plotting six correct points (2) five correct points (1) smooth line of best fit (1)			
			(iii)	1	0.66 (graph) ± 0.02			

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
7	1	(a)		1	Br ₂			
		(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 ₂ low melting point	colourless

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
8	2	(a)	(i)		1	carbon, sulfur and hydrogen	C, S and H	H ₂ 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	

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
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	
FT	HT		
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>