GCSE SCIENCE - CHEMISTRY (NEW)

C2 Mark Scheme - January 2013

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
1		(a)	(i)		1	neutron and proton ***both needed, either order***			
			(ii)		1	number of protons equals the number of electrons / 6 protons and 6 electrons present		number of positives = number of negatives	reference to neutrons
		(b)	(i)		2	12 + 4 (1) = 16 (1) ***If no working shown, award 2 marks for correct answer only (cao)*** ***Consequential marking – follow through (ft)***			
			(ii)		2	12/16 × 100 (1) = 75 (1) ***If no working show , award 2 marks for cao*** ***Consequential marking – ft***			

Question Number									
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2		(a)	(i)		1	**A**			
			(ii)		1	**C**			
			(iii)		1	**B**			
		(b)	(i)		1	yellow **flame**	orange flame	yellow	
			(ii)		1	white **precipitate**		white	

Question Number									
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3		(a)			2	photochromic (1) changes colour with changes in light (intensity) / in light (and dark) / u.v. (light) (1)		appearance changes	
		(b)			2	thermochromic (1) changes colour with changes in temperature / when hot (and cold) / when exposed to heat (1)	changes colour at a certain temperature	reference to pattern appearing	

Question Number									
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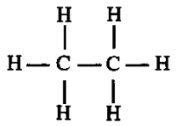
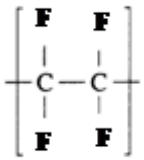
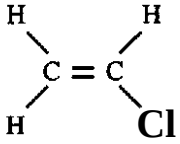
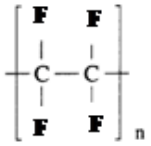
4		(a)	(i)		1	**A** and **D** ***both needed, either order***		breathing	
			(ii)		1	**D**			
		(b)			1				
		(c)			2	 (1)  (1)			

Question Number									
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5		(a)			5	**Method 1** • equal volumes of water sample/ actual volume given *e.g. 20cm^3* • add equal volume of soap solution/ actual volume *e.g. 5cm^3* • shake same number of times / shake equally • measure height of lather – *could be implied in final point* • hardest water forms least froth (accept converse) (1) mark per point **Method 2** • equal volumes of water sample/ actual volume given *e.g. 20cm^3* add 1 cm^{3}of soap solution at a time • shake the same number of times (after adding each 1 cm^3 soap sol.) • record volume of soap sol. to obtain permanent lather – *could be implied in final point* • hardest water needs most soap solution (accept converse) (1) mark per point			
		(b)	(i)		1	reduces heart disease / strengthens bones and teeth			tastes better
			(ii)		1	forms limescale (when heated)			
			(iii)		1	tastes better			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
6		(a)			1	boiling point	size of chain / molecular mass/ density	boiling	melting point
		(b)			1	condensation / condensing / condenses			
		(c)			1	takes the temperature of the fraction / takes the temperature of the vapour			
		(d)			1	fractional distillation		distillation / fractionation	fractionating distillation

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7		(a)			1	**B** and **D** ***Both needed, either order***			
		(b)			1	**C**			
		(c)			2	4/8 (1) = 0.5 (1) ***If no working shown, award 2 marks cao*** ***Consequential marking only if one of 4 or 8 are correct – ft***			

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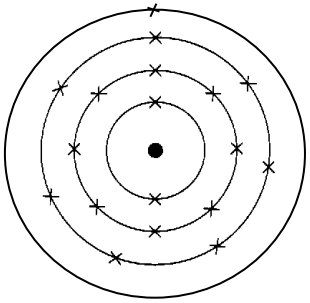
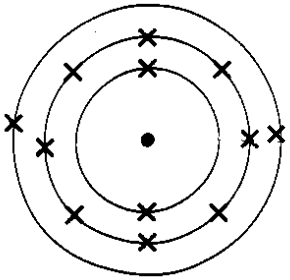
8	1	(a)	(i)		1		2.8.8.1		
			(ii)		1		2.8.2 correct diagram of calcium structure / 2.8.8.2 [element to right of (a)(i) above rather than to right of original element drawn]		
		(b)			1	isotope			

Question Number									
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9	2	(a)			2	Concentration: 8 (g/dm^3) (1) Reason: experiment times close together / reaction times close together / little variation between times (1)	only 2 seconds variation between reaction times		
		(b)			1	use a light sensor / use a datalogger / same person recording the reaction times / same person adds the acid and starts the stopwatch / same person watches X disappear		use a computer	
		(c)			1	temperature		heat	catalyst
		(d)			3	• the **higher the concentration**, the **faster the rate** the higher the concentration the shorter the reaction time (1) • the higher the concentration the **more particles** are present (1) • the more particles the **greater the chance of collision** the more particles present more collisions per second the more particles present more collisions in a given time (1)		more collisions	reference to increased energy

Question Number									
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10	3	(a)	(i)		1	tarnish / lose their shiny appearance	go dull / less shiny	grey / forms an oxide / corrodes	reference to rust
			(ii)		1	they react at different speeds / potassium reacts the quickest / lithium reacts the slowest / the speed at which the change occurs	reactivity increases down the group		
		(b)	(i)		3	**A** = bromine / Br_2 / Br **B** = iodine / I_2 / I **C** = chlorine / Cl_2 / Cl all correct (2) any one correct (1) Reason: reactivity decreases down the group (1)	 chlorine most reactive, iodine least		
			(ii)		3	Reactants: Fe Cl_2 (1) Product: $FeCl_3$ (1) Balancing: 2:3:2 (1) ***Reactants and products must be correct before balancing mark can be awarded***	 multiples of 2 and 3 e.g. 4:6:4		

Question Number			
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11	4	6	**Indicative content:** Reference to sedimentation, filtration and chlorination together with the reason for each process e.g. sedimentation / settling tank: removal of large insoluble particles filtration / filter bed: removal of small insoluble particles removal of bacteria / germs / micro-organisms chlorination: kills remaining bacteria / germs / micro-organisms **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.