Chemistry 1 – Common questions

Question Number								
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
8	1	*(a)*			2	(silicon difficult to classify) because it has metallic and non-metallic properties (1) response clearly indicating one or more metallic property and contrasting non-metallic property, e.g. it has a high melting point/boiling point like a metal but is brittle like a non-metal (2)	semi-metal / metalloid		it is a metal and a non-metal
		(b)			1	Mg (ignore atomic number / mass number)		magnesium	
		(c)	(i)		1	2			
			(ii)		1	Ag_2O	$Ag^{+}{}_2O^{2-}$		
		(d)	(i)		1	antibacterial / antiviral / antifungal	kills germs / kills bacteria / antiseptic	disinfectant reduces smells	
			(ii)		1	silver nanoparticles can get into drinking water / water supplies / lakes / rivers could be dangerous to health / harmful / toxic don't know the effect / long term effect not known *uncertainty* must *be implied*		reference to the air / atmosphere / rain pollutes water / the environment	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
9	2	*(a)*			2	melting points decrease (down the group) / decrease but Mg doesn't fit the pattern (1) boiling points have no trend (1)		 boiling points go up and down	
		(b)			2	extremely fast / explosively / even faster than strontium .....*must imply greater than 'very fast'* (1) reactivity increases down Group 2 / reactivity increases down the group / reaction gets quicker down the group (1)		 barium lies below strontium / reaction gets stronger down the group	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
10	3	*(a)*	(i)	I	1	to burn / act as fuel / heat the furnace to form carbon monoxide	 to reduce iron ore / iron oxide		
				II	1	remove impurities / sand / silica react with impurities / sand / silica		to form slag purify the iron	
			(ii)	I	1	$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$			
				II	1	iron oxide / iron(III) oxide		Fe_2O_3 iron ore / haematite	Fe
		(b)	(i)		2	*basic comment* it increases then decreases (1) *higher level comment with use of numerical data* it increases to a maximum with 0.8 (% carbon) then decreases / it increases up to 800 (MPa) then decreases (2)			
			(ii)		1	cast iron		3.6	

Question Number			
FT	HT	Mark	Answer
11	4	6 QWC	Indicative content Reference to useful properties of plastics compared with properties of traditional materials Plastic properties: low density, thermal insulator, electrical insulator, waterproof, strong, easily coloured, non-biodegradable (doesn't corrode, erode or rot), cheap, can now be made biodegradable Properties of plastics vs properties of traditional materials for uses, such as: window frames, electrical wire covering, saucepan handles, drain pipes, buckets, carrier bags, bottles etc. 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 1 – Higher tier only questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	5	*(a)*			5	A carbon dioxide / CO_2 B magnesium chloride / $MgCl_2$ C hydrogen / H_2 D sodium chloride / NaCl E copper(II) oxide / CuO copper(II) hydroxide / $Cu(OH)_2$	copper oxide copper hydroxide		$CuCO_3$
		(b)			1	$ZnCl_2$	$Zn^{2+}Cl^-_2$ $Zn(Cl)_2$		

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	6	*(a)*			2	4.0-1.2 = 2.8 (1) $\frac{2.8}{4.0} \times 100 = 70\,\%$ (1) consequential marking correct answer only (2)	65 % for 2nd mark		2.6
		(b)			1	toothpaste / mouthwash / fortified milk drinks / fortified yogurt			
		(c)			2	no mark for opinion answer includes simple reference to one disadvantage or advantage (1) statement conveys why advantage outweighs disadvantage or vice versa – must reference opposite viewpoint (1) e.g. Yes – reduces tooth decay but many think it is unethical – 2 marks No – mass medication although it does prevent tooth decay – 2 marks			

Question Number								
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	7	*(a)*			3	all points plotted correctly (2) any 3 correct (1) line of best fit from the origin (0,0) (using a ruler) (1)			
		(b)			1	experimental results below expected ones / experimental results not on a straight line	less copper formed	reference to accuracy erratic results	
		(c)			2	any 2 sensible possible errors in procedure for (1) each e.g. • not all magnesium reacted / insufficient stirring • magnesium not clean / had reacted before experiment / turned to oxide • not all copper retrieved / copper left behind in beaker / filter • not drying sufficiently • inaccurate weighing (2) max			

(d)			3	displacement / iron removes copper from solution / copper reduced and iron oxidised (1) products named (could be in equation) iron sulfate and copper $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (1) explanation in terms of reactivity e.g. iron more reactive / higher in reactivity series than copper (1)			
(e)			2	property (1) use (1) *must relate to property* e.g. (good) thermal conductor .....saucepans high melting point..... saucepans does not corrode.....coins/jewellery does not react with water.....(water) pipes malleable ……. pipes/jewellery ductile …….. wiring shiny/coloured/lustrous …… jewellery sonorous …….. bells			electrical conductivity

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	8	*(a)*			2	evidence is initially strong then not (1) increase in solar activity accompanied by increase in temperature / upward trend in both followed by breakdown of trend (1)			
		(b)	(i)		1	increase in the burning of (fossil) fuels / increase in the use of (fossil) fuels	'fuels' = named fuels e.g. coal, petrol, etc.	deforestation	
			(ii)		1	• carbon capture • burning less (fossil) fuels *any sensible method of using less fossil fuels* *e.g. walking instead of using the car, switching off lights, etc* • use alternative energy sources *accept a named alternative energy source* *e.g. solar (panels), wind (turbines), etc* • reduce deforestation / plant more trees			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	9	*(a)*			1	they are used as fuels / it is the petrol fraction / they are easier to burn			C_5-C_8 produces more energy
		(b)			2	cracking (1) converting large molecules into smaller ones / converting large molecules into more useful ones (1)			
		(c)			1	$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$			

Question Number			
FT	HT	Mark	Answer
	10	6 QWC	Indicative content Reference to reasons relating to choice of process, rationale for conditions, reasons why products are formed at electrodes, electrode equations e.g. aluminium high in reactivity series / aluminium is a reactive metal aluminium oxide stable ∴ electrolysis used molten electrolyte necessary to allow ions to move electrolysis expensive due to high amount of electricity needed cryolite added to reduce melting point ∴ reduce amount of energy needed Al^{3+} ions attracted to cathode (– electrode) and O^{2-} ions attracted to anode (+ electrode) electrode equations / overall equation 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.