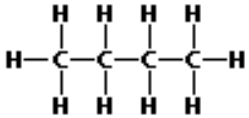
Chemistry 3 - Foundation Tier only questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
1		(a)			3	methane (1) C_3H_8 (1)  (1)			
		(b)	(i)		1	A			
			(ii)		1	E			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
2		(a)	(i)		1	air and natural gas – both needed	methane		nitrogen and hydrogen
			(ii)		1	3 : 2			
			(iii)		1	catalyst / speeds up reaction / increases rate			
			(iv)		1	remove / separate / get ammonia (from the unreacted gases)		condenses ammonia / turns ammonia to liquid	
			(v)		1	re-use (unreacted nitrogen and hydrogen) not to waste (unreacted nitrogen and hydrogen) not having to make more nitrogen and hydrogen	conserves natural gas less energy needed		
		(b)			1	ammonium nitrate			
		(c)	(i)		1	increases crop yield			
			(ii)		1	increases soil acidity			

Question Number									
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3		(a)			2	32 + 35 + 12 + 12 + 6 = 97 (1) 100-97 = 3 (1) – correct answer only (cao) (2) – follow through error (ft)			
		(b)			2	dust noise / blasting (heavy) lorries / traffic destroys landscape / ruins landscape / unsightly destroys habitats / ruins habitats / destroys wildlife – any two for (1) each		pollution	
		(c)	(i)		1	calcium oxide + water → calcium hydroxide			reference to quicklime and/or slaked lime
			(ii)		2	steam / water boils quicklime crumbles / expands / 'puffs up' / breaks up hisses – any two for (1) each	fizzes	explodes heat released	

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
4		(a)			1	fermentation / fermenting			
		(b)			1	any one from: (yeast/it) doesn't change acts as a catalyst is not used up not a reactant		increases rate 'catalyst'	
		(c)			1	30			
		(d)	(i)		1	distillation			fractional distillation
			(ii)		2	ethanol's boiling point is lower (than that of water / glucose solution) ethanol boils at 80°C and water / glucose solution boils at any value between 100-110°C (1) ethanol distils over first / boils leaving the glucose solution behind / ethanol is collected first (1)		ethanol and glucose solution have *different* boiling points	
		(e)			1	any one from: drink driving / road accidents domestic violence aggressive behaviour argumentative behaviour		time wasted by emergency services / cost of emergency services being drunk	alcohol poisoning / death by choking on vomit / depression / liver disease

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
5		(a)			1	burette			
		(b)			1	indicator(s)			pH indicator universal indicator
		(c)			2	adding smaller volume of acid (at a time) / adding 0.1 cm^3 acid (at a time) / *accept any volume below 0.5 cm^3* (1) to obtain the exact end point value / to get the exact volume indicator turns red / changes colour to get the exact volume when complete neutralisation occurs (1) *answer must imply a 'better'/more accurate volume reading obtained*	adding drops (at a time)	repeat readings	
		(d)			1	B need the *most* acid – both needed		needs lot of acid / more acid	

Question Number								
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
6		(a)			3	brick-red (for Cu^{2+} flame test) (1) yellow precipitate (for Cl^- ion test) (1) white (precipitate for Fe^{3+} test) (1)			
		(b)			1	sodium chloride, water and ammonia – all needed			

Chemistry 3 - Common questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
7	1	(a)	(i)	I	1	sulfur / S			
				II	1	vanadium(V) oxide / vanadium oxide / vanadium pentoxide / V_2O_5		VO	
				III	1	sulfuric acid / H_2SO_4	oleum	dilute / conc	
			(ii)		3	reactants: $SO_2 + O_2$ (1) product: SO_3 (1) balancing: $2(SO_2)$ $2(SO_3)$ (1) – reactants and product must be correct before balancing mark awarded			
		(b)			2	(blue hydrated copper(II) sulfate) turns white (1) (crystalline hydrated copper (II) sulfate) turns powdery / turns crumbly / loses its crystalline appearance (1)		changes colour	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
8	2	(a)			3	all points plotted correctly (±½ square) (2) any five points plotted correctly (1) smooth continuous curve through all points – judgement by eye (1)			
		(b)			1	any one from: same surface area (of substances) same concentration (of peroxide solution) same temperature / all at room temperature			
		(c)			1	any one from: liver contains the most catalase / enzyme carrot contains the least catalase / enzyme any correct comparison in terms of catalase e.g. liver contains more catalase than apple / apple contains more catalase than potato / potato contains more catalase than carrot catalase present in all substances			
		(d)			1	re-lights a glowing splint – both needed			lighted splint burns brighter

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
9	3	(a)	(i)		1	sodium carbonate / Na_2CO_3	sodium hydrogencarbonate / $NaHCO_3$		
			(ii)		1	magnesium ethanoate / $(CH_3COO)_2Mg$			
		(b)			1	(ethanoic acid/it) is a weaker acid / has a higher pH (than that of sulfuric acid) ethanoic acid pH is 3/4 and sulfuric acid pH is 1/2 ethanoic acid has a lower H^+ ion concentration than sulfuric acid	less acidic	ethanoic acid pH is 3/4	
		(c)			1	ethanol / C_2H_5OH			

Question Number			
FT	HT	Mark	Guidance
10	4	6	Indicative content: Reference to *principle* of fire triangle – fuel, heat and air (oxygen) are needed, removing any one factor will put fire out Types of fire fighting methods related to examples • heat removed by water e.g. house fires, bonfires • air removed: o fire blanket e.g. chip pan fire, person on fire o CO_2 / powder e.g. indoor fires, chemical fire, electrical fire o foam e.g. aeroplane fire • fuel removed: o fire-break e.g. forest fire o gas supply switched off e.g. natural gas fire 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.