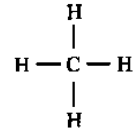
Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
1		(a)			3	three factors – air/oxygen, fuel and heat all three for (2) any two for (1) remove any one to put out fire (1)			
		(b)			2	Method 1: removes air/oxygen (1) Method 2: removes fuel (1)			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
2		(a)	(i)		2	 (1) C_2H_6 (1)			
			(ii)		1	C_8H_{18}			
		(b)	(i)		1	ethanol		alcohol	
			(ii)		1	**C**			
			(iii)		1	wine / beer / alcoholic drinks fuels / biofuels solvents antibacterial gels perfumes / aftershaves any one for (1)		alcohol / drinking / drinks / medicine / cleaning	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)	(i)		2	number of nitrogen atoms **2** number of hydrogen atoms **6** **both** needed for (1) equal / same number (of these atoms) on right hand side (1)			
			(ii)		1	gas / gaseous			
		(b)	(i)	I	1	cooling			
				II	1	recycling			
			(ii)		2	iron (1) speeds up reaction (1)			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
4		(a)			3	limestone / chalk / marble (1) CaO (1) calcium hydroxide (1)			
		(b)	(i)		1	brick-red	red		
			(ii)		2	carbon dioxide / CO_2 (1) must have correct gas to award test mark turns limewater milky (1)			
			(iii)		2	1.9/2.0 (1) 95 (1) award (2) for correct answer only (cao)			
		(c)			2	landscaping during /after quarry to remove visual pollution restrict quarry size to reduce visual pollution trains instead of lorries blast at agreed times spray lorry wheels with water to reduce dust remove endangered species to safe site any two for (1) each	other sensible	reference to economic benefits	
		(d)			2	local jobs money into local economy limestone for building / named buildings e.g. houses, walls, etc. local industries / named industry e.g. for making cement/iron building better local road system any two for (1) each	other sensible		

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
5		(a)	(i)		1	ammonia	NH_3		
			(ii)		1	copper(II) hydroxide	copper hydroxide $Cu(OH)_2$		
			(iii)		1	$Fe(OH)_2$			
		(b)	(i)		1	sulfuric acid is stronger / more acidic (than ethanoic acid) ethanoic acid is weaker / less acidic (than sulfuric acid)	sulfuric acid is strong and ethanoic acid is weak	pH of sulfuric acid is 1 and pH of ethanoic acid is 3	
			(ii)	I	1	reaction with sulfuric acid would be faster more reactive / more bubbles / gets hotter with sulfuric acid	converse answers		
				II	1	(gas) pops with **lighted** splint			

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
6	1	(a)	(i)		3	SO_2 O_2 (1) SO_3 (1) formulae must be correct to get balancing mark 2, 1, 2 (1)			
			(ii)		2	30 (2) if incorrect answer credit (1) for two correct readings from graph i.e. 86 and 56			
			(iii)		2	H_2SO_4 (1) [no mark for SO_3] $H_2S_2O_7$ (1)			
		(b)			3	black mass forms / black solid forms / sugar turns black (1) steam / water vapour / hissing (1) smell (1) any two for (1) each carbon (1)		temperature rise / water formed / bubbles / fizzing	

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
7	2	(a)			2	100 × 4.2 × 30 (1) 12600 (1) award (2) for cao			
		(b)			1	same height between flame and can same can/same wick/ same spirit burner same stirring (or not) not using a lid for all alcohols changing the water each time / using cold water each time any one for (1)		same room temperature / conditions	
		(c)			3	theoretical values greater (than experimental values) (1) both values increase down alcohol group (1) loss of heat to the surroundings / can (1)	rank order the same		
		(d)			2	two linked points required e.g. biofuels have a lower energy output than traditional fuels (1) and therefore require greater quantities to be consumed (in order to produce the same amount of energy) (1) credit sensible alternatives uses land that would otherwise be used to grow food crops (1) leading to food shortage/price increase (1) growth requires large amounts of water (1) which is therefore not available for other uses (1)			

Question Number			
FT	HT	Mark	Answer
8	3	6	**Indicative content** **Benefits e.g.** increase crop yield, more food, healthier plants, improves quality of soil, cheaper food and releases land for other purposes. **Problems e.g.** increased soil acidity (which needs neutralising using lime), pollutes water supplies/ nitrates in drinking water (possible health problems), overgrowth of plants in canals (which requires unblocking) and 'eutrophication' or full description – (algae over growth, bloom formation, sunlight blocked, plants die, bacteria removes oxygen during decomposition, water de-oxygenated and water becomes lifeless) **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.