

Question Number	Answer	Acceptable answers	Mark
1(a)	oxidation		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	An explanation linking the following points <ul style="list-style-type: none"> • large(r) surface area (1) • more frequent collisions with catalyst / reaction will go faster (1)OWTE 	large(r) {surface /area} more collisions	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	An explanation linking the following points <ul style="list-style-type: none"> • catalyst becomes warmer (1) • {reactions faster / catalyst works better} when hotter (1) 	gas (particles){move faster/more energy}	(2)

Question Number	Answer	Acceptable answers	Mark
1(c)	$2 \text{CO} + \text{O}_2 \rightarrow 2 \text{CO}_2$ <ul style="list-style-type: none"> • LHS formulae (1) • RHS formula (1) • balancing correct formulae (1) 	allow multiples	(3)

Question Number	Answer	Acceptable answers	Mark
1(d)	An explanation linking the following points <ul style="list-style-type: none"> • heat energy { given out / of reactants higher than products} / ORA (1) • (so) exothermic (1) 	ignore bond making and breaking	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)	An explanation linking two of the following temperature decreases (1) {heat / energy} taken in (1) (so process) endothermic (1)	ignore references to bond breaking / making heat given out / exothermic = 1 max.	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)	Shown correctly on diagram: horizontal line to right of reactant (1) product line below reactant line (1)	ignore any connecting lines product label not needed	(2)

Question Number	Answer	Acceptable answers	Mark
2(c)	D : heat energy is required heat energy is released		(1)

Question Number		Indicative Content	Mark
QWC	* 2(d)	<p>An explanation including some of the following points</p> <p>smaller pieces of solid of same mass larger surface area more frequent collisions higher rate of reaction</p> <p>higher temperature particles move faster more frequent collisions particles have more energy more collisions have required energy to react / activation energy more collisions successful higher rate of reaction</p> <p>ORA</p>	(6)
Level	0	No rewardable content	
1	1 - 2	a limited explanation of one of factors e.g. at higher temperature higher rate e.g. when particles smaller size higher rate the answer communicates ideas using simple language and uses limited scientific terminology spelling, punctuation and grammar are used with limited accuracy	
2	3 - 4	a simple explanation e.g. at higher temperature particles move faster, more collisions so higher rate e.g. smaller sized particles (of same mass) have greater surface area so higher rate the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accuracy	
3	5 - 6	a detailed explanation e.g. (when particles collide they) only react when they have sufficient energy/activation energy and at a higher temperature more of the particles have sufficient energy/activation energy so more collisions will be successful and when particles smaller size higher rate the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately spelling, punctuation and grammar are used with few errors	