AQA GCSE Science Combined Foundation

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$		2	AO2 5.2.2.2
01.2	temperature		1	AO2 5.6.1.2
01.3	$\frac{45}{60}$ $= 0.75\ (cm^3/s)$		1	AO2 5.6.1.1
01.4	faster more gas produced in the same time/bigger surface area so more frequent collisions		1 1	AO2 5.6.1.1
01.5	balance/top-pan balance/scales		1	AO2 5.6.1.2
02.1	sulfuric acid + sodium carbonate → carbon dioxide + water + sodium sulfate	award one mark if word equation correct but salt name is incorrect	2	AO2 5.4.2.2
02.2	$98\ g/dm^3$		1	AO2 5.6.1.2
02.3	volume of carbon dioxide cm^3		1 1	AO2 5.6.1.2
02.4	line is steeper stops at the same level at original line but sooner		1 1	AO2 5.6.1.2

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03.1	independent: surface area of calcium carbonate/lump vs powdered calcium carbonate dependent: volume of gas released (in 150 seconds)		1 1	AO2 5.6.1.2
03.2	even time points (every 10 s)/regular time intervals/more frequent time intervals		1	AO3 5.6.1.2
03.3	85		1	AO2 5.6.1.2
03.4	all points plotted	allow error carried forward for question **08.3**	1	AO2 5.6.1.2
03.5	powdered calcium carbonate has greater surface area increase in frequency of collisions between calcium carbonate and nitric acid particles		1 1	AO1 5.6.1.3
04.1	sodium chloride sulfur		1	AO2 5.6.1.2
04.2	measured the time taken for the cross to disappear/solution to become cloudy		1	AO2 5.6.1.2
04.3	use data logger/repeat it		1	AO3 5.6.1.2
04.4	as temperature increases, the rate of reaction increases/time taken goes down		1	AO3 5.6.1.2
04.5	rate of reaction slow because energy of most collisions between particles below activation energy		1 1	AO2 5.6.1.3

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04.6	**one** from: • concentration of hydrochloric acid • concentration of sodium thiosulfate	do not allow concentration on its own allow add catalyst	1	AO1 5.6.1.2
05.1	**four** from: • add water to a conical flask/beaker • place conical flask/beaker onto a balance • zero balance • add lithium and quickly measure the mass • put cotton wool into the spout of the conical flask • measure the decrease in mass of lithium as the reaction progresses	accept a method that involves measuring the change in the pH of the solution one mark for each correct answer up to a maximum of four marks	4	AO1 5.6.1.1
05.2	*(mean) rate of reaction* = $\frac{\text{change in mass}}{\text{time}}$		1	AO1 5.6.1.1
05.3	g/s		1	AO1 5.6.1.1
05.4	no		1	AO2 5.6.1.2
06.1	hydrogen		1	AO1 5.4.2.1
06.2	decreasing the acid concentration		1	AO1 5.6.1.2

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06.3	rate decreases/particles have less kinetic energy decreases the frequency of collisions between zinc and nitric acid fewer collisions with activation energy needed		1 1 1	AO1 5.6.1.2
07.1	same shape with same starting and end point, but the peak is lower		1	AO1 5.6.1.4
07.2	double-headed arrow drawn from reactants to peak for the catalysed line labelled activation energy		1	AO1 5.6.1.4
07.3	enzymes		1	AO1 5.6.1.4
07.4	lowers activation energy alternative pathway for reaction		1 1	AO1 5.6.1.4
08.1	mass		1	AO2 5.6.1.1
08.2	198 – 170 = 28 $\frac{28}{150}$ = 0.19 g/s		1 1 1	AO1 AO2 5.6.1.1
08.3	$Ca(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2(g)$		1	AO3 5.6
08.4	half points plotted all points plotted line of best fit		1 1 1	AO2 AO3 5.6.1.1

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08.5	tangent at 20 s tangent at 100 s		1 1	AO3 5.6.1.1
08.6	slope of tangent at 20 seconds steeper than tangent at 100 seconds rate of reaction at 20 seconds greater than at 100 seconds more reactant particles at 20 seconds so greater frequency of collisions		1 1 1 1	AO2 5.6.1.1 5.6.1.3
09.1	increases reaction rate by providing a pathway with a lower activation energy		1	AO1 5.6.1.4
09.2	B		1	AO1 5.6.1.4
09.3	$2H_2O_2 \rightarrow 2H_2O(l) + O_2$	one mark for balancing one mark for state symbols	2	AO1 5.2.2.2 5.3.1.1
09.4	it is a catalyst/regenerated at the end		1	AO2 5.6.1.4
10.1	**Level 3:** The method is clear and variables are correctly explained.		5-6	AO1 5.6.1.2
	Level 2: The method is clear, but variables are absent or incorrect **or** the method is attempted but not clear and some variables correctly provided.		3-4	
	Level 1: Either an unclear method (perhaps with some steps missing) or a few variables correctly identified.		1-2	
	No relevant content.		0	

Question	Answers	Extra information	Mark	AO / Specification reference

	Indicative content:
	• add water to a conical flask/beaker
	• place conical flask/beaker onto a balance
	• put nitric acid into conical flask
	• prepare a bung with gas syringe attached
	• add sodium carbonate
	• put bung in as soon as sodium carbonate is added
	• measure time taken to produce a set volume of carbon dioxide/measure the volume of carbon dioxide produced in set time
	• repeat with different concentrations of nitric acid
	• control variables:
	  ○ same mass of sodium carbonate used
	  ○ same temperature
	  ○ same surface area sodium carbonate/always use solid pieces or powder
	  ○ same volume of nitric acid used
	• independent variable: concentration of nitric acid
	• dependent variable: rate or volume of CO_2 /mass of gas produced/pH change
		accept an upside-down measuring cylinder as an appropriate method
		accept a method that involves measuring the change in mass of sodium carbonate/pH of reaction mixture.		

10.2	as the concentration of nitric acid increases, the rate of reaction increases the higher the concentration, the more acid particles are available in a given volume so frequency of successful collisions will increase		1 1 1	AO1 AO3 5.6.1.2
10.3	cm^3/s		1	AO2 5.6.1.1

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Question	Answers	Extra information	Mark	AO / Specification reference
10.4	$\frac{500}{42} = 11.9$ $= 11.9$		1 1	AO2 5.6.1.1
10.5	catalyst/temperature		1	AO1 5.6.1.2