

# AQA Style

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GCSE

COMBINED SCIENCE: TRILOGY

Foundation Tier

Chemistry Paper 2

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**F**

**Mark Scheme**



## Question 1

Question	Answers	Extra information	Mark
01.1	<p>The concentration of the acid</p> <p>control</p> <p>dependent</p> <p>The volume of gas produced.</p> <p>The volume of the acid.</p>	<p>1 mark for each correct line.</p> <p>If more than one line is drawn from one box, award no marks for that box.</p>	2
01.2	$\frac{30}{40}$ <p>= 0.75</p>	<p>Allow 0.8</p> <p>Ignore units.</p>	1 1
01.3	cm <sup>3</sup> /s	If more than one box is ticked, award no marks.	1
01.4	all points plotted correctly	Allow a tolerance of $\pm\frac{1}{2}$ a small square.	2
	curve of best fit ignoring the anomalous point at (150, 74)	Allow correct line of best fit for incorrectly plotted points.	1
01.5	The rate of the reaction increases because successful collisions are more frequent.	If more than one box is ticked, award no marks.	1
<b>Total</b>			<b>9</b>



## Question 2

Question	Answers	Extra information	Mark
02.1	potable	If more than one box is ticked, award no marks.	1
02.2	<p>filtration</p> <p>sterilisation</p> <p>To kill microbes.</p> <p>To purify the water.</p> <p>To remove dissolved substances from the water.</p> <p>To remove solids from the water.</p>	1 mark for each correct line. If more than one line is drawn from one box, award no marks for that box.	2
02.3	<p>chlorine gas</p> <p>pure water</p> <p>salty water</p> <p>atom</p> <p>compound</p> <p>element</p> <p>hydrocarbon</p> <p>lattice</p> <p>mixture</p>	1 mark for each correct line. If more than one line is drawn from one box, award no marks for that box.	3
02.4	damp litmus paper	If more than one box is ticked, award no marks.	1
02.5	condensation	Allow from gas/vapour to liquid.	1
02.6	graph A	If more than one box is ticked, award no marks.	1
<b>Total</b>			<b>9</b>



### Question 3

Question	Answers	Extra information	Mark
03.1	reversible reaction	If more than one box is ticked, award no marks.	1
03.2	(the amount of carbon dioxide in the atmosphere) decreased	Accept any term that describes a reduction in carbon dioxide.	1
03.3	enzyme		1
03.4	the minimum amount of energy that particles must have to react	If more than one box is ticked, award no marks.	1
03.5	a curve that increases from the reactants line and reaches a peak below the existing line		1
03.6	the forward and reverse reactions occur at (exactly) the same rate		1
<b>Total</b>			<b>6</b>



## Question 4

Question	Answers	Extra information	Mark												
04.1	A	If more than one box is ticked, award no marks.	1												
04.2	petrol	Allow reference to the top fraction.	1												
04.3	different fractions/ hydrocarbons have different boiling points  so vapours/hydrocarbons/ fractions condense  at different levels/heights		1  1  1												
04.4	<table border="1"><thead><tr><th>Statement</th><th>Cracking</th><th>Fractional Distillation</th></tr></thead><tbody><tr><td>It is a chemical process.</td><td>✓</td><td></td></tr><tr><td>It separates molecules.</td><td></td><td>✓</td></tr><tr><td>It uses a catalyst.</td><td>✓</td><td></td></tr></tbody></table>	Statement	Cracking	Fractional Distillation	It is a chemical process.	✓		It separates molecules.		✓	It uses a catalyst.	✓		1 mark for each correct row.	3
Statement	Cracking	Fractional Distillation													
It is a chemical process.	✓														
It separates molecules.		✓													
It uses a catalyst.	✓														
04.5	add bromine water  turns from orange to colourless		1  1												
<b>Total</b>			<b>10</b>												



## Question 5

Question	Answers	Extra information	Mark
05.1	a mixture designed as a useful product	If more than one box is ticked, award no marks.	1
05.2	X	If more than one box is ticked, award no marks.	1
05.3	sample/batch C is correct/ contains the right ingredients	Sample/batch C is the <u>only</u> one that is correct/contains the correct ingredients receives marking points 1 and 3.	1
	(because) it matches the correct medicine/ has the same dots/pattern/ the substances travelled the same distances	Sample/batch C is the <u>only</u> one that matches the correct medicine, has the same dots/ pattern, they travelled the same distances receives marking points 2 and 4.	1
	samples/batches A, B and D are not correct/do not contain the right ingredients		1
	(because) they do not match the correct medicine/they have different dots/patterns/ the substances travelled different distances		1
05.4	it stayed on the start line/ didn't move		1
	(because) it was not soluble (in the solvent used)		1
05.5	$\frac{8}{40}$	Accept $R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$	1
	0.2		1
<b>Total</b>			<b>10</b>



## Question 6

Question	Answers	Extra information	Mark
06.1	<p>Any <b>two</b> from:</p> <ul style="list-style-type: none"><li>• extracting and/or processing of raw materials</li><li>• manufacturing/making the product and/or packaging</li><li>• using the product during its lifetime</li><li>• disposal (at the end of its useful life)</li><li>• transport/distribution at each stage</li></ul>	For each step, allow a clear description of the process or a specific example related to a named product.	<b>2</b>
06.2	<b>Level 2:</b> The ways in which relevant features are similar/different is made clear. The magnitude of the difference is described.		<b>3-4</b>
	<b>Level 1:</b> There is a simple comparison of the indicators for each type of bag.		<b>1-2</b>
	<b>No relevant content.</b>		<b>0</b>
	<b>Indicative content:</b> <ul style="list-style-type: none"><li>• Comparison: Producing paper bags uses more water than producing plastic bags.</li><li>• Magnitude: Producing paper bags uses 700/3.5× more litres of water than producing plastic bags.</li><li>• Comparison: Producing paper bags releases more CO<sub>2</sub> than producing plastic bags.</li><li>• Magnitude: Producing paper bags releases 3kg/3× more CO<sub>2</sub> than producing plastic bags.</li><li>• Comparison: Plastic bags are more likely to end up as litter than paper bags.</li><li>• Magnitude: There is a 5× higher risk of plastic bags becoming litter compared to paper bags/the risk of a plastic bag becoming litter is 1 but the risk of a paper bag becoming litter is only 0.2.</li></ul>		



<b>06.3</b>	Any <b>one</b> from: <ul style="list-style-type: none"><li>• not all impacts are easy to calculate/ some impacts require human judgements/ it is not a purely objective process</li><li>• different people may come up with different judgements</li><li>• judgements may be biased/ misused</li></ul>	Accept a specific example, e.g. to support advertising claims.	<b>1</b>
<b>Total</b>			<b>7</b>





## Question 7

Question	Answers	Extra information	Mark
07.1	methane	Accept CH <sub>4</sub> . Accept water vapour. Accept nitrous oxide. Accept ozone.	1
07.2	Any <b>two</b> from: <ul style="list-style-type: none"><li>• burning fossil fuels/ combustion (to generate electricity, heat homes or run vehicles)</li><li>• deforestation</li><li>• grazing cattle</li><li>• rice fields</li><li>• disposing of waste in landfill sites</li></ul>	If no mark has been awarded for grazing cattle or rice fields allow <b>1</b> mark for farming/ agriculture.	2
07.3	the results are peer-reviewed	Accept checked by other scientists.	1
	to prevent false claims	Accept to check that the data/ results are reproducible.  Accept to check the results are valid.	1



<b>07.4</b>	<b>Level 3:</b> A judgement is supported by a range of logically linked reasons. There is at least one statement from each section of the indicative content.	<b>5-6</b>
	<b>Level 2:</b> Some logically linked reasons are given. There may also be a simple judgement. There is at least one statement from each section of the indicative content.	<b>3-4</b>
	<b>Level 1:</b> Relevant points are made that do not need to be linked. Two marks can be awarded for two valid statements.	<b>1-2</b>
	<b>No relevant content.</b>	<b>0</b>
	<b>Indicative content:</b> <b>Points in support of the statement:</b> <ul style="list-style-type: none"><li>• The trend in Figure 11 shows a decrease in temperature.</li><li>• Figure 10 shows that the global temperature regularly decreases for a few years.</li><li>• The trend in Figure 11 fits the pattern of fluctuations/increases and decreases shown in Figure 10.</li></ul> <b>Points against the statement:</b> <ul style="list-style-type: none"><li>• Figure 10 shows an upward trend in temperature since 1964.</li><li>• Figure 11 shows an increase in temperature between 2018 and 2019.</li><li>• The decrease in 2018 in Figure 11 is unlikely to be anomalous as it fits the pattern of results in Figure 10.</li><li>• Figure 11 only includes four years of data (while Figure 10 includes 140).</li><li>• Figure 11 includes data only from March each year.</li><li>• Figure 11 includes data from one location while Figure 10 includes data from across the world.</li><li>• So the calculation of the mean temperature in Figure 10 is more accurate.</li><li>• The data and methods in Figure 10 have been peer reviewed/verified but the data in Figure 11 has not.</li><li>• Therefore, the data in Figure 10 is more likely to be valid.</li></ul>	
<b>Total</b>		<b>11</b>



## Question 8

Question	Answers	Extra information	Mark
08.1	$C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$	Allow multiples.	1
08.2	$\frac{12 \times 3}{4} \times 100$	Accept $\frac{36}{44} \times 100$	1
	81.8181....		1
	81.8	An answer of 81.8 with no working shown scores <b>3</b> marks.  $\frac{12}{44} \times 100 = 27.2727... \text{ scores } 1 \text{ mark.}$  An answer of 27.3 scores <b>2</b> marks.	1
08.3	incomplete combustion will occur  Any <b>three</b> from: <ul style="list-style-type: none"><li>• (therefore) carbon monoxide will be produced</li><li>• which is a toxic gas</li><li>• that is colourless/odourless/ not easily detected</li></ul> <ul style="list-style-type: none"><li>• (therefore) particulate carbon/particulates/soot will be produced</li><li>• which can irritate the lung linings/make asthma worse/ cause cancer</li></ul>	Allow reference to less oxygen available for combustion.  Effects of the pollutants must be linked to the correct pollutant.  Allow description of effects of inhaling carbon monoxide.	1  <b>3</b>
<b>Total</b>			<b>8</b>