

APOLLO

Energy from fuels

SL

Chemistry

First assessment 2025

6 questions | mark schemes

8.	(a)	(i)	ethanol has higher melting point $6\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l}) \rightarrow \text{C}_6\text{H}_{12}\text{O}_6(\text{aq}) + 6\text{O}_2(\text{g}) \checkmark$		1
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Question			Answers	Notes	Total
8.	(a)	(ii)	Any two: «ethanol is» renewable / sustainable resource $\checkmark$ «ethanol has» low/zero carbon footprint / produces less CO_2 $\checkmark$ less sulfur dioxide «than fossil fuels» OR less acid rain «than fossil fuels» $\checkmark$ less incomplete combustion «than fossil fuels» OR less carbon monoxide/soot «than fossil fuels» $\checkmark$	Accept “ethanol is biodegradable /less toxic than gasoline”. Do not accept just “less harmful”.	2 max
8.	(b)		«$Q = (4.00 / 46.08) \times 1367 =$» 119 kJ / 119000 J $\checkmark$ «$\Delta T = Q / mc = 119000 / (500.0 \times 4.18) =$» 56.9 «K» $\checkmark$	Accept 56.8 «K».	2

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q18 | 1 marks

18. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q15 | 1 marks

15. C

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q17 | 1 marks

17. A

Chemistry SL | Paper 1A | Specimen 2025 | Q18 | 1 marks

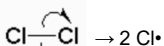
18. D

4.	(a)		$\text{C}_{17}\text{H}_{36}(\text{l}) + 26\text{O}_2(\text{g}) \rightarrow 17\text{CO}_2(\text{g}) + 18\text{H}_2\text{O}(\text{l}) \checkmark$		1
4.	(b)	(i)	$n_{\text{C}_{17}\text{H}_{36}} = \frac{2.00 \text{ g}}{[(17 \times 12.01 \text{ g mol}^{-1}) + (36 \times 1.01 \text{ g mol}^{-1})]} = \frac{2.00 \text{ g}}{240.53 \text{ g mol}^{-1}} = 0.008315 / 0.00831 \text{ «mol»} \checkmark$ $\text{« energy = } 11350 \text{ kJ mol}^{-1} \times 0.008315 \text{ mol = » } 94.4 \text{ «kJ»} \checkmark$		2
4.	(b)	(ii)	$94\,400 = 500.0 \times 4.18 \times \Delta T \checkmark$ $\Delta T = 45.2 \text{ «K»} \checkmark$		2
4.	(b)	(iii)	<i>Any two:</i> water does not evaporate $\checkmark$ heat is not lost to the surroundings $\checkmark$ OR all heat is transferred to the water $\checkmark$ density of water is $1 \text{ g cm}^{-3} \checkmark$ water is pure $\checkmark$ complete combustion $\checkmark$		2 max

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Question			Answers	Notes	Total
4.	(c)		CO_2 consumed while plant is growing «and later released when biofuel is combusted» OR photosynthesis uses up CO_2 «later released when biofuel is combusted» $\checkmark$		1
4.	(d)		bonds broken: $4(\text{C} - \text{C}) / 4 \times 346 \checkmark$ bonds formed: $2(\text{C}=\text{C}) / 2 \times 614 \checkmark$ $\Delta H^\ominus = \text{«} 4 \times 346 - 2 \times 614 / 1384 - 1228 = \text{»}$ «+»156 «kJ» $\checkmark$	Award [3] for correct final answer.	3
4.	(e)		$\text{C}_2\text{H}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{C}_2\text{H}_5\text{OH}(\text{g}) \checkmark$		1
4.	(f)	(i)	H_2O / water $\checkmark$		1
4.	(f)	(ii)	$\frac{\text{«} 20(12.01) + 38(1.01) + 2(16.00) = 310.58}{100 \times 310.58} = \frac{(310.58 + 18.02)}{(310.58 + 18.02)} = 94.5 \% \checkmark$		1
4.	(f)	(iii)	<i>Any two of:</i> sustainable development $\checkmark$ more economical/efficient $\checkmark$ better use of natural resources $\checkmark$ reduces waste $\checkmark$		2 max

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Question			Answers	Notes	Total
			 $\text{Cl}-\text{Cl} \rightarrow 2 \text{Cl}^\bullet$		