

APOLLO

Chemistry

SL Answers

First assessment 2025

Whole questions arranged by syllabus topic.

Original question and scheme crops preserve source diagrams.

APOLLO

Measuring enthalpy changes

10 questions

Mark-scheme answers

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

18. D

Chemistry SL | Paper 1A | May 2025 TZ1 | Q19 | 1 marks

19. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q15 | 1 marks

15. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q16 | 1 marks

16. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q16 | 1 marks

16. D

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

17. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q16 | 1 marks

16. A

2.	(a)		$\llcorner 26.77^{\circ}\text{C} - 25.00^{\circ}\text{C} = \gg 1.77^{\circ}\text{C/K} \gg \checkmark$ $\llcorner 5.65\text{ g} \times 4.18\text{ J g}^{-1}\text{K}^{-1} \times 1.77^{\circ}\text{C} = \gg 41.8 \llcorner \text{J} \gg \checkmark$	Award [2] for correct final answer.	2
2.	(b)		$\llcorner 26.77^{\circ}\text{C} - 100.00^{\circ}\text{C} = \gg -73.23^{\circ}\text{C/K} \gg \checkmark$ $\llcorner -41.8\text{ J}/1.28\text{ g} \times -73.23^{\circ}\text{C} = \gg 0.446 \llcorner \text{J g}^{-1}\text{K}^{-1} \gg \checkmark$	Award [2] for correct final answer. Award [2] if 40.5 J is used and answer is "0.432" $\llcorner \text{J g}^{-1}\text{K}^{-1} \gg$. Award [1] max for -0.446 $\llcorner \text{J g}^{-1}\text{K}^{-1} \gg$.	2
2.	(c)		iron $\checkmark$		1

– 9 –

8825–6211M

2.	(d)		Any two of: loss of heat from metal during transfer $\checkmark$ loss of heat from/no insulation for beaker B/second calorimeter $\llcorner$ to surrounding $\gg \checkmark$ water evaporating from beaker B/second calorimeter during metal transfer $\checkmark$ not accounting for the heat absorbed by/heat capacity of beaker B/second calorimeter $\checkmark$	Accept "water mass very small". Accept "distilled/deionized/pure water not used". Do not penalize failing to identify beaker more than once. Do not accept "metal may have oxidized". Do not accept "water transferred with metal" as this would give opposite result. Do not accept "heat loss" alone.	2 max
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– 10 –

8825–6211M

Question	Answers	Notes	Total
	saturate chamber/chromatogram with solvent vapor $\checkmark$	Accept "affects/increases distance the solvent travels" for M1. Award [1] for descriptions of	

Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q16 | 1 marks

16. B

Chemistry SL | Paper 1A | Specimen 2025 | Q17 | 1 marks

17. B

APOLLO

Energy cycles in reactions

2 questions

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q17 | 1 marks

17. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q16 | 1 marks

16. B

APOLLO

Energy from fuels

6 questions

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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– 10 –

2225 – 6224M

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

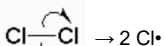
18. D

4.	(a)		$C_{17}H_{36}(l) + 26O_2(g) \rightarrow 17CO_2(g) + 18H_2O(l)$ ✓		1
4.	(b)	(i)	$n_{C_{17}H_{36}} = \frac{2.00 \text{ g}}{[(17 \times 12.01 \text{ g mol}^{-1}) + (36 \times 1.01 \text{ g mol}^{-1})]} = \frac{2.00 \text{ g}}{240.53 \text{ g mol}^{-1}} =$ $0.008315/0.00831 \text{ «mol»}$ ✓ $\text{« energy = } 11350 \text{ kJ mol}^{-1} \times 0.008315 \text{ mol = » } 94.4 \text{ «kJ»}$ ✓		2
4.	(b)	(ii)	$94\,400 = 500.0 \times 4.18 \times \Delta T$ ✓ $\Delta T = 45.2 \text{ «K»}$ ✓		2
4.	(b)	(iii)	<i>Any two:</i> water does not evaporate ✓ heat is not lost to the surroundings ✓ OR all heat is transferred to the water ✓ density of water is 1 g cm^{-3} ✓ water is pure ✓ complete combustion ✓		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» ✓		1
4.	(d)		bonds broken: $4(C - C) / 4 \times 346$ ✓ bonds formed: $2(C = C) / 2 \times 614$ ✓ $\Delta H^\ominus = \text{«} 4 \times 346 - 2 \times 614 / 1384 - 1228 = \text{»}$ $\text{«+»} 156 \text{ «kJ»}$ ✓	Award [3] for correct final answer.	3
4.	(e)		$C_2H_4(g) + H_2O(g) \rightarrow C_2H_5OH(g)$ ✓		1
4.	(f)	(i)	H_2O / water ✓		1
4.	(f)	(ii)	$\frac{\text{«} 20(12.01) + 38(1.01) + 2(16.00) = 310.58 \text{ »}}{100 \times 310.58} =$ $\frac{(310.58 + 18.02)}{(310.58 + 18.02)} =$ » 94.5% ✓		1
4.	(f)	(iii)	<i>Any two of:</i> sustainable development ✓ more economical/efficient ✓ better use of natural resources ✓ reduces waste ✓		2 max

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Question			Answers	Notes	Total
			 $Cl-Cl \rightarrow 2 Cl\cdot$		

APOLLO

How much? The amount of chemical change

18 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q20 | 1 marks

20. C

Chemistry SL | Paper 1A | May 2025 TZ1 | Q21 | 1 marks

21. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q17 | 1 marks

17. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q18 | 1 marks

18. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q3 | 1 marks

3. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q18 | 1 marks

18. A

Chemistry SL | Paper 1A | May 2025 TZ3 | Q21 | 1 marks

21. D

3.	(a)	reasonable line of best fit ✓ extrapolated past data given «extended beyond 0.08 AND 0.4 mol dm⁻³» ✓	Line can touch all data points. Accept range of extrapolation through origin to 0.02 mol dm⁻³ AND past data given for M2. Line can extend beyond graph range.	2
3.	(b)	«directly/positively» proportional OR positive linear ✓	Accept answers based on $y=mx+b$. Accept “«directly/positively» proportional OR positive linear” if extrapolation started from 0.02 mol dm⁻³. Do not accept “positive correlation” alone.	1

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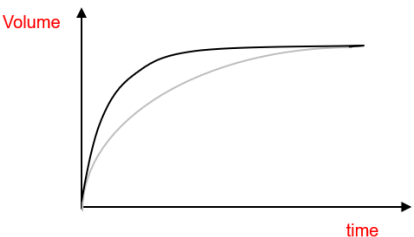
2225 – 6211M

Question			Answers	Notes	Total
3.	(c)		gradient = 2.0 ✓ absorbance/A = 2.0 concentration/C OR $y = 2.0x$ ✓	Accept gradient/slope range of 1.9-2.3 for M1. Accept “$y=mx+b$” with range of -0.03-0 for b. Do not accept equation with +b values for M2.	2
3.	(d)		1.22 ✓	Accept answer in the range of 1.20-1.30. Do not ECF from calculation as error is contradiction to graph.	1

3.	(a)	$\text{CaCO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$ correct products AND state symbols ✓ correct balancing ✓	<i>Do not accept $\text{H}_2\text{CO}_3(\text{aq})$ for M1.</i> <i>Accept ionic equation.</i>	2
3.	(b)	$n(\text{CaCO}_3) \llcorner = \frac{3.162 \text{ g}}{100.09 \text{ g mol}^{-1}} \llcorner = 0.0316 \llcorner \text{mol} \llcorner$ AND $n(\text{HCl}) \llcorner = 4.00 \text{ mol dm}^{-3} \times 20.0 \times 10^{-3} \text{ dm}^3 \llcorner = 0.0800 \llcorner \text{mol} \llcorner$ ✓ CaCO_3 is limiting ✓	<i>Do not award M2 without working/answer seen for M1</i>	2
3.	(c)	$\llcorner V = 0.0316 \text{ mol} \times 22.7 \text{ dm}^3 \text{mol}^{-1} = \llcorner$ $0.717 \llcorner \text{dm}^3 \llcorner$ ✓		1

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2225 – 6212M

Question	Answers	Notes	Total
3. (d)	 Greater gradient AND from origin AND same final volume ✓	<i>Lines must not cross.</i>	1
	$\llcorner \text{catalyst provides} \llcorner$ alternative reaction pathway ✓ $\llcorner \text{catalyst} \llcorner$ lower(s) activation energy ✓	<i>M1 requires a description of the reaction going from reactants to products if exact wording not</i>	

5.	(a)	hydrogen is the limiting reactant OR $2\text{H}_2:1\text{C}_2\text{H}_6$ ✓ 80.0 cm ³ ✓	Award [2] for correct final answer. Accept answers expressed in dm ³ .	2
5.	(b)	60.0 cm ³ of C ₂ H ₂ in excess/leftover ✓ «60.0 cm ³ of C ₂ H ₂ + 80.0 cm ³ of C ₂ H ₆ =» 140.0 cm ³ ✓	Award [2] for correct final answer. Accept answers expressed in dm ³ .	2

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q19 | 1 marks

19. C

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q20 | 1 marks

20. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q21 | 1 marks

21. C

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q4 | 1 marks

4. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q18 | 1 marks

18. C

Chemistry SL | Paper 1A | Specimen 2025 | Q19 | 1 marks

19. A

Chemistry SL | Paper 1A | Specimen 2025 | Q20 | 1 marks

20. C

Chemistry SL | Paper 1A | Specimen 2025 | Q21 | 1 marks

21. A

APOLLO

How fast? The rate of chemical change

15 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q22 | 1 marks

22. A

Chemistry SL | Paper 1A | May 2025 TZ1 | Q23 | 1 marks

23. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q19 | 1 marks

19. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q20 | 1 marks

20. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q21 | 1 marks

21. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q19 | 1 marks

19. A

2.	(a)	use volumetric flask ✓ make up to line ✓ mix/invert/shake «the final solution» ✓	Marking points can be in any order.	3 max
2.	(b)	«dilute solution to» make several/multiple concentrations ✓ measure the absorbance/transmittance «of these solutions» ✓ plot graph of absorbance/transmittance vs/against concentration «with a straight line of best fit» ✓	Do not accept “colour” for absorbance/transmittance for M2.	3
2.	(c)	measure the absorbance/transmittance «of the unknown» AND use graph to determine concentration ✓	Accept “Draw a line across from the absorbance/transmittance «on the y-axis» to the calibration curve and read off «intercept on» the concentration «axis». Accept use of the equation of the line. Do not accept “colour” instead of absorbance, unless applying ECF from 2(b).	1

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q22 | 1 marks

22. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q23 | 1 marks

23. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q19 | 1 marks

19. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q20 | 1 marks

20. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q21 | 1 marks

21. D

Chemistry SL | Paper 1A | Specimen 2025 | Q22 | 1 marks

22. B

Chemistry SL | Paper 1A | Specimen 2025 | Q23 | 1 marks

23. A

2.	(a)		Any two for [1 max] type of orange juice temperature light intensity «initial» surface area OR «initial» volume AND flask ✓		1
2.	(b)	i	Any one of: to perform multiple titrations ✓ too concentrated «so using too much iodine solution» ✓ end-point colour easier to see ✓		1
2.	(b)	ii	flask has to be opened to withdraw samples «so not 0 h» OR air was present in the flask at the start «so the ascorbic acid was exposed to air» ✓		1
2.	(b)	iii	titrate only once after two weeks OR fill flask with nitrogen/argon/inert gas OR withdraw samples with syringe «without opening flask» ✓		1
2.	(c)		$\left\langle \frac{0.1 \text{ cm}^3}{15.0 \text{ cm}^3} \times 100 = \right\rangle 0.7 \text{ \%}$ ✓		1
2.	(d)	i	$\left\langle \frac{(5.3 \times 10^{-3} \text{ mol dm}^{-3} - 1.1 \times 10^{-3} \text{ mol dm}^{-3})}{14 \text{ d}} \right\rangle = 3.0 \times 10^{-4}$ ✓ mol dm ⁻³ d ⁻¹ ✓	Accept values in the range 2.9×10^{-4} - 3.1×10^{-4} . Accept values converted to other units, such as 3.4×10^{-9} - 3.6×10^{-9} mol dm ⁻³ s ⁻¹ or 0.29 - 0.31 mmol dm ⁻³ d ⁻¹ .	2

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2.	(d)	ii	«support» longer daily exposure leads to lower concentration of ascorbic acid OR 0 h decreases the least ✓ «doesn't support» no direct evidence of oxidation by oxygen ✓		2
2.	(d)	iii	should be stored in sealed container OR should be consumed in a few days after opening ✓		1
2.	(e)		Any one of: effect of temperature/light AND would show the value of refrigeration/darkness ✓ effect of preservative ✓ compare types of orange juice «e.g. fresh, from concentrate, etc.» ✓		1

APOLLO

How far? The extent of chemical change

12 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q24 | 1 marks

24. B

Chemistry SL | Paper 1A | May 2025 TZ2 | Q22 | 1 marks

22. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q23 | 1 marks

23. A

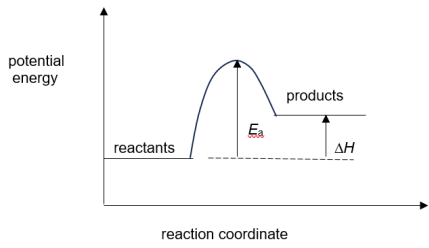
Chemistry SL | Paper 1A | May 2025 TZ3 | Q20 | 1 marks

20. C

2.	(a)		$1s^2 2s^2 2p^6 3s^2 3p^6 3d^7$ / $[\text{Ar}] 3d^7$ ✓		1
2.	(b)	(i)	$K = \frac{[\text{CoCl}_4^{2-}]}{[\text{Co}^{2+}][\text{Cl}^-]^4}$ ✓		1
2.	(b)	(ii)	no effect on K AND mixture has more $[\text{CoCl}_4]^{2-}$ / product OR no effect on K AND equilibrium shifts to the right ✓		1
2.	(b)	(iii)	endothermic AND equilibrium shifts to right OR endothermic reaction is favoured by increase in temperature ✓	Accept endothermic as forward reaction removes heat Accept endothermic and more products formed	1

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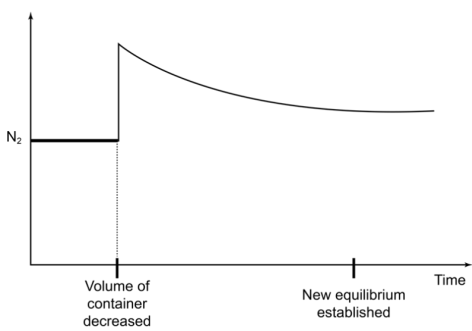
2225 – 6212M

Question			Answers	Notes	Total
2.	(b)	(iv)	 products and reactants labelled ✓ E_a from reactants level to peak ✓ ΔH from reactant to product ✓	Accept double-headed arrows for E_a and ΔH. ΔH should correspond to answer in 2a Accept names of reactants and products	3

3.	(a)	gases, reacting strongly, attracted to each other. $[N_2] = 0.545$ AND $[H_2] = 0.727$ AND $[NH_3] = 0.112$ «mol dm⁻³» ✓ $K = \frac{[NH_3]^2}{[N_2][H_2]^3}$ ✓. «$K = \frac{0.112^2}{0.545 \times 0.727^3} = 0.0599$ ✓.	Award [3] for correct final answer. Award [3] for $K_p = 1.66 \times 10^{-9}$.	3
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2225 – 6224M

Question			Answers	Notes	Total
3.	(b)		 sharp increase at time volume of container decreased ✓ gradual decrease to second reference point ✓ final constant concentration above initial concentration ✓	Accept straight line or curve for M2.	3
				Accept 2-bromo-3,3-dimethylbutane or	

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q24 | 1 marks

24. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q22 | 1 marks

22. C

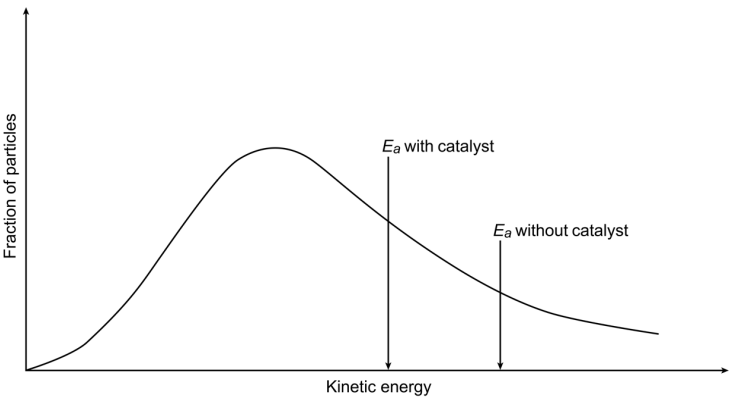
Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q23 | 1 marks

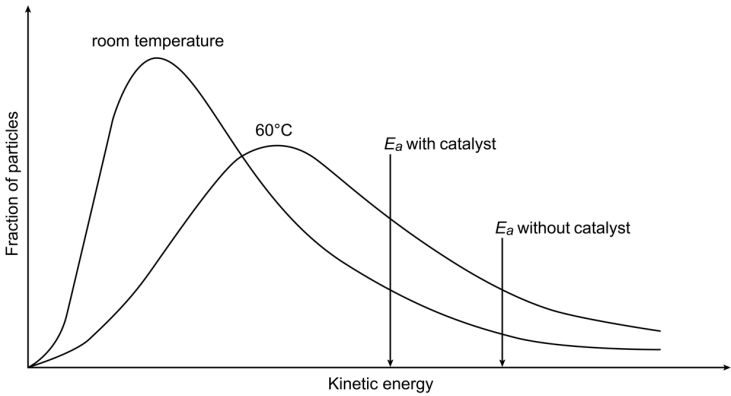
23. C

3.	(a)	(i)	$K = \frac{[C_2H_5OH]^2 [H_2O]}{[C_2H_5CO_2C_2H_5]}$ ✓ <i>Do not accept expression without H₂O.</i>	1
3.	(a)	(ii)	«amount of» ethanol = 0.2 «mol» ✓ AND «amount of» water = 0.4 «mol» ✓	2
3.	(a)	(iii)	value would be higher AND reaction is exothermic in the forward direction/equilibrium will shift to the right ✓	1

– 11 –

8825–6212M

3.	(b)	(i)	 correct shape curve starting at the origin, without touching the x axis at high energy. ✓ (E_a) catalysed < (E_a) uncatalysed on x axis. ✓	2
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3.	(b)	(ii)	 room temperature 60°C Fraction of particles Kinetic energy E_a with catalyst E_a without catalyst curve with peak higher AND to left AND decreasing at lower KE and labelled. ✓	Accept the correct label on either or both curves. Do not award mark if line crosses x axis or rises above the 60 C curve at high energy.	1
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Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q24 | 1 marks

24. A

1.	(a)		Reactant: Cl_2 0 Products: HOCl +1 HCl -1 ✓ ✓	Award [2] for three correct. Award [1] for any two correct.	2
1.	(b)		equilibrium shifts to the right/product AND $\text{HCl}/\text{HOCl}/\text{H}^+$ removed/neutralized «by NaOH» ✓	Accept any suitable equation to illustrate the neutralization reaction.	1
1.	(c)	i	Any one of: pressure not given ✓ use of different units OR different ways of measuring ✓ different precisions/significant figures OR uncertainties not given ✓		1 max
1.	(c)	ii	$0.177 \text{ «dm}^3\text{»} \times 2.86 \text{ «g dm}^{-3}\text{»} / 0.506 \text{ «g»}$ OR $\frac{0.506 \text{ «g»}}{70.9 \text{ «g mol}^{-1}\text{»} \times 0.100 \text{ «dm}^3\text{»}}$ ✓ $0.0714 \text{ «mol dm}^{-3}\text{»}$ ✓	Award [2] for correct final answer. Accept use of $PV = nRT$ to calculate the solubility. Using $P = 100 \text{ kPa}$ gives a solubility of $0.0703 \text{ «mol dm}^{-3}\text{»}$.	2

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1.	(c)	iii	«as temperature increases solubility decreases» dissolution is exothermic «hence equilibrium shifts to reactants side at higher temperatures» OR thermal energy overcomes intermolecular forces between chlorine and water OR negative entropy change «of dissolution» becomes more dominant at higher temperatures ✓	Accept “kinetic energy increases with temperature «so more gas molecules escape»”.	1
1.	(d)		Any one of: toxic ✓ gas ✓ difficult to handle/store ✓		1 max
1.	(e)		0 - 6 ✓	Accept any number or range below pH 6.5.	1
1.	(f)	i	$\text{NH}_3(\text{aq}) + 2\text{HOCl}(\text{aq}) \rightarrow \text{NHCl}_2(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$ ✓		1
1.	(f)	ii	pH > 5/high ✓ low concentration of $\text{Cl}_2/\text{HOCl}/\text{NH}_3$ ✓	Do not accept general statements such as “less urination in the pool”.	2
1.	(g)		Any two of lower water evaporation ✓ reduce energy consumption/less energy needed to heat the water ✓ higher solubility of chlorine «so less chlorine lost» ✓	Accept “less chlorine needed AND fewer bacteria”.	2 max

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Question	Answers	Notes	Total
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APOLLO

Proton transfer reactions

13 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q25 | 1 marks

25. B

Chemistry SL | Paper 1A | May 2025 TZ1 | Q26 | 1 marks

26. B

Chemistry SL | Paper 1A | May 2025 TZ2 | Q24 | 1 marks

24. D

Chemistry SL | Paper 1A | May 2025 TZ2 | Q25 | 1 marks

25. D

Chemistry SL | Paper 1A | May 2025 TZ2 | Q26 | 1 marks

26. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q24 | 1 marks

24. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q25 | 1 marks

25. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q26 | 1 marks

26. A

Chemistry SL | Paper 1A | May 2025 TZ3 | Q30 | 1 marks

30. C

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q25 | 1 marks

25. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q24 | 1 marks

24. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q25 | 1 marks

25. B

Chemistry SL | Paper 1A | Specimen 2025 | Q25 | 1 marks

25. C

APOLLO

Electron transfer reactions

20 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q17 | 1 marks

17. D

Chemistry SL | Paper 1A | May 2025 TZ1 | Q27 | 1 marks

27. D

Chemistry SL | Paper 1A | May 2025 TZ1 | Q30 | 1 marks

30. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q13 | 1 marks

13. D

Chemistry SL | Paper 1A | May 2025 TZ2 | Q27 | 1 marks

27. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q28 | 1 marks

28. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q29 | 1 marks

29. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q14 | 1 marks

14. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q27 | 1 marks

27. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q28 | 1 marks

28. A

6.	(a)	(i)	$\text{Li} \rightarrow \text{Li}^+ + \text{e}^-$ OR $\text{LiC}_6 \rightarrow \text{C}_6 + \text{Li}^+ + \text{e}^- \checkmark$	<i>Do not accept 6C.</i> <i>Do not penalize equilibrium arrows.</i>	1
6.	(a)	(ii)	arrow from cathode to anode in the external circuit $\checkmark$	<i>Do not award mark if any arrows are in the electrolyte.</i>	1
6.	(b)		«battery» stores «surplus» energy «from solar panel» $\checkmark$	<i>Accept "stores charge/power for night use".</i> <i>Accept "charges battery".</i>	1

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q12 | 1 marks

12. C

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q26 | 1 marks

26. B

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q27 | 1 marks

27. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q28 | 1 marks

28. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q26 | 1 marks

26. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q27 | 1 marks

27. C

4.	(a)		FeSO ₄ / FeCl ₂ ✓	Accept other iron(II) salts. Award [1] for the chemical formula of a suitable salt which is given as part of an equation, such as $\text{FeSO}_4 \rightarrow \text{Fe}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq})$	1
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8825 – 6223M

4.	(b)		salt bridge «immersed in both half-cells» ✓ «both» electrodes connected to light bulb «by wires» ✓	Accept specific examples of salt bridges. Do not accept half-cells instead of electrodes. Award marks if these components are clearly shown in a diagram. Ignore any meters mentioned.	2
4.	(c)		A / amperes / amps ✓	Accept mA, milliamperes, milliamps. Award [0] if any other units are given.	1

Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q26 | 1 marks

26. C

Chemistry SL | Paper 1A | Specimen 2025 | Q27 | 1 marks

27. B

APOLLO

Electron sharing reactions

4 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ2 | Q30 | 1 marks

30. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q29 | 1 marks

29. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q29 | 1 marks

29. D

Chemistry SL | Paper 1A | Specimen 2025 | Q29 | 1 marks

29. D

APOLLO

Electron-pair sharing reactions

10 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q28 | 1 marks

28. B

Chemistry SL | Paper 1A | May 2025 TZ1 | Q29 | 1 marks

29. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q29 | 1 marks

29. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q11 | 1 marks

11. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q30 | 1 marks

30. C

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q28 | 1 marks

28. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q30 | 1 marks

30. D

4.	(a)	nucleophilic substitution ✓	Accept S_N2 , but not S_N1 .	1
4.	(b)	curly arrow from lone pair or – to C ✓ curly arrow from bond to Br ✓ structural formulas of both organic reactant and product correct ✓	Do not accept condensed structural formulas. Do not penalize if a candidate has S_N1 mechanism if arrows are correctly placed.	3
4.	(c)	broken (C-Br)/285 AND formed (C-O)/358 OR broken (5(414)+346+285+463) / 3164 AND formed (5(414)+346+358+463) / 3237 ✓ «$\Delta H = \text{bond(s) broken} - \text{bond(s) formed} \Rightarrow -73 \text{ «kJ mol}^{-1}\text{»} \checkmark$	Award [2] for correct final answer. Award [1 max] for +73 «kJ mol⁻¹».	2

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Question	Answers	Notes	Total
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Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q28 | 1 marks

28. A

Chemistry SL | Paper 1A | Specimen 2025 | Q30 | 1 marks

30. B

APOLLO

Introduction to the particulate nature of matter

4 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ2 | Q1 | 1 marks

1. A

Chemistry SL | Paper 1A | May 2025 TZ2 | Q8 | 1 marks

8. B

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q1 | 1 marks

1. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q1 | 1 marks

1. B

APOLLO

The nuclear atom

5 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q1 | 1 marks

1. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q2 | 1 marks

2. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q4 | 1 marks

4. B

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q2 | 1 marks

2. B

Chemistry SL | Paper 1A | Specimen 2025 | Q2 | 1 marks

2. B

APOLLO

Electron configurations

11 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q2 | 1 marks

2. D

Chemistry SL | Paper 1A | May 2025 TZ1 | Q3 | 1 marks

3. A

Chemistry SL | Paper 1A | May 2025 TZ1 | Q5 | 1 marks

5. D

Chemistry SL | Paper 1A | May 2025 TZ2 | Q3 | 1 marks

3. B

Chemistry SL | Paper 1A | May 2025 TZ2 | Q4 | 1 marks

4. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q6 | 1 marks

6. A

Chemistry SL | Paper 1A | May 2025 TZ3 | Q5 | 1 marks

5. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q12 | 1 marks

12. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q3 | 1 marks

3. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q2 | 1 marks

2. C

Chemistry SL | Paper 1A | Specimen 2025 | Q3 | 1 marks

3. C

APOLLO

Counting particles by mass: The mole

8 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ2 | Q5 | 1 marks

5. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q1 | 1 marks

1. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q2 | 1 marks

2. B

5.	(a)		AND $C = 2.59 \text{ «g»} \checkmark$ $\ll m(O) = 4.32 - (m(C) + m(H))$ $= 4.32 - (2.59 + 0.581) = 1.15 \text{ g} \gg$ $n(O) = \frac{1.15 \text{ g}}{16.00 \text{ g mol}^{-1}} \quad / 0.0718 \text{ «mol»} \checkmark$ $\ll m(C):n(H):n(O) = 0.216 : 0.575 : 0.0718 = 3 : 8 : 1 \gg$ $C_3H_8O \checkmark$	<i>M3 for finding empirical formula Award [3] for correct final answer.</i>	3
5.	(b)	(i)	$T = 373 \text{ K AND } V = 5.57 \times 10^{-5} \text{ m}^3$ OR $T = 373 \text{ K AND } 0.0557 \text{ dm}^3 \text{ and } 1 \times 10^2 \text{ kPa} \checkmark$ $\ll n = \frac{PV}{RT} = \frac{1.00 \times 10^5 \text{ Pa} \times 5.57 \times 10^{-5} \text{ m}^3}{8.31 \text{ J K}^{-1} \text{ mol}^{-1} \times 373 \text{ K}} \gg$ $n = 0.00180 \text{ «mol»} \checkmark$	<i>Award [2] for correct final answer.</i>	2
5.	(b)	(ii)	$\ll M = \frac{0.108 \text{ g}}{0.00180 \text{ mol}} \gg$ $60.0 / 60.1 \text{ «g mol}^{-1}\gg \checkmark$	<i>If $n = 0.00220 \text{ mol}$ is used, $M = 49.1 \text{ «g mol}^{-1}\gg$</i> <i>Accept mass of 60</i>	1

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Question	Answers	Notes	Total
	H. .CH ₃	Accept any correct structural	

Mark-scheme answers

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q4 | 1 marks

4. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q3 | 1 marks

3. C

Chemistry SL | Paper 1A | Specimen 2025 | Q4 | 1 marks

4. A

1.	(a)	$n_H = \frac{66.66 \text{ g}}{1.01 \text{ g mol}^{-1}} = 6.66 \text{ «mol»}$ $n_O = \frac{53.28 \text{ g}}{16.00 \text{ g mol}^{-1}} = 3.33 \text{ «mol»} \checkmark$ $\text{CH}_2\text{O} \checkmark$		2
1.	(b)	$n_{\text{HX}} (= n_{\text{NaOH}}) = 0.750 \text{ «mol dm}^{-3}\text{»} \times 0.02230 \text{ «dm}^3\text{»} / 0.0167 \text{ «mol»} \checkmark$ $M_{\text{HX}} = \left(\frac{1.51 \text{ g}}{0.0167 \text{ mol}} \right) = 90.4 \text{ g mol}^{-1} \checkmark$	Accept 90.3 «g mol ⁻¹ ».	2
1.	(c)	$\text{C}_3\text{H}_6\text{O}_3 \checkmark$	Accept consistent feasible structural formula.	1
1.	(d)	carboxyl/COOH $\checkmark$	Do not accept "carbonyl/C=O".	1

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Question	Answers	Notes	Total
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APOLLO

Ideal gases

6 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q4 | 1 marks

4. A

Chemistry SL | Paper 1A | May 2025 TZ1 | Q6 | 1 marks

6. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q5 | 1 marks

5. C

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q5 | 1 marks

5. C

1.	(a)	Any one of: forms nitrous acid / HNO_2 / nitric acid / HNO_3 ✓ contributes to acid rain ✓ catalyses decomposition of ozone / contributes to ozone hole/depletion ✓ «respiratory» irritant/toxic ✓	Accept suitable equations showing acid rain formation or ozone depletion. Accept photochemical smog/forms NO_2.	1 max						
1.	(b)	$T = 200 + 273$ «K» ✓ «$n = PV/RT$» «$n = \frac{(1.0 \times 10^5)(1.0 \times 10^{-3})}{8.31(200 + 273)}$» «$n =$» 0.025 «mol» ✓ «$0.10\% \times 0.025 =$» 2.5×10^{-5} «mol» ✓	Award [3] for correct final answer.	3						
1.	(c)	<table border="1"><thead><tr><th>Element</th><th>Initial oxidation state</th><th>Final oxidation state</th></tr></thead><tbody><tr><td>N/Nitrogen</td><td>+2</td><td>0</td></tr></tbody></table> N/nitrogen AND +2 → 0 ✓	Element	Initial oxidation state	Final oxidation state	N/Nitrogen	+2	0	Accept II but not 2 or 2+ instead of +2.	1
Element	Initial oxidation state	Final oxidation state								
N/Nitrogen	+2	0								

Question	Answers	Notes	Total
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Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q5 | 1 marks

5. C

APOLLO

The ionic model

7 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q7 | 1 marks

7. D

Chemistry SL | Paper 1A | May 2025 TZ1 | Q10 | 1 marks

10. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q6 | 1 marks

6. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q7 | 1 marks

7. B

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q6 | 1 marks

6. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q12 | 1 marks

12. A

Chemistry SL | Paper 1A | Specimen 2025 | Q6 | 1 marks

6. B

APOLLO

The covalent model

14 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q9 | 1 marks

9. B

Chemistry SL | Paper 1A | May 2025 TZ1 | Q11 | 1 marks

11. C

Chemistry SL | Paper 1A | May 2025 TZ1 | Q13 | 1 marks

13. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q7 | 1 marks

7. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q8 | 1 marks

8. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q22 | 1 marks

22. C

Chemistry SL | Paper 1A | May 2025 TZ3 | Q23 | 1 marks

23. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q7 | 1 marks

7. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q8 | 1 marks

8. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q10 | 1 marks

10. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q6 | 1 marks

6. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q7 | 1 marks

7. D

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q14 | 1 marks

14. B

Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q7 | 1 marks

7. D

APOLLO

The metallic model

6 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ2 | Q9 | 1 marks

9. A

Chemistry SL | Paper 1A | May 2025 TZ3 | Q9 | 1 marks

9. A

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q9 | 1 marks

9. C

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q9 | 1 marks

9. B

Chemistry SL | Paper 1A | Specimen 2025 | Q8 | 1 marks

8. A

Chemistry SL | Paper 1A | Specimen 2025 | Q11 | 1 marks

11. D

APOLLO

From models to materials

5 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q8 | 1 marks

8. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q8 | 1 marks

8. B

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q10 | 1 marks

10. D

Chemistry SL | Paper 1A | Specimen 2025 | Q9 | 1 marks

9. D

Chemistry SL | Paper 1A | Specimen 2025 | Q10 | 1 marks

10. D

APOLLO

The periodic table: Classification of elements

14 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q14 | 1 marks

14. A

Chemistry SL | Paper 1A | May 2025 TZ1 | Q15 | 1 marks

15. A

Chemistry SL | Paper 1A | May 2025 TZ1 | Q16 | 1 marks

16. B

Chemistry SL | Paper 1A | May 2025 TZ2 | Q11 | 1 marks

11. B

Chemistry SL | Paper 1A | May 2025 TZ2 | Q12 | 1 marks

12. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q11 | 1 marks

11. B

Chemistry SL | Paper 1A | May 2025 TZ3 | Q13 | 1 marks

13. B

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q14 | 1 marks

14. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q11 | 1 marks

11. A

Chemistry SL | Paper 1A | Nov 2025 TZ3 | Q13 | 1 marks

13. A

1.	(a)			Accept x from 155–165 y from 500–700	1
1.	(b)		closer an electron is to the nucleus the greater the «electrostatic» attraction ✓	Accept smaller atomic radius for electron closer to the nucleus. Accept converse statement.	1
1.	(c)	(i)	inverse/negative «correlation» ✓	Do not accept inverse proportionality. Award [0] if linear relationship mentioned. Do not accept when AR increases IE decreases.	1

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1.	(c)	(ii)	similar trends / distribution of points ✓ as the period number increases the curve/distribution shifts down AND to the right OR as the period number increases the curve/distribution shifts to lower IE AND greater radius ✓	For M1 accept IE decreases as atomic radius increases .	2
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Question	Answers	Notes	Total
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Mark-scheme answers

Chemistry SL | Paper 1A | Specimen 2025 | Q13 | 1 marks

13. A

Chemistry SL | Paper 1A | Specimen 2025 | Q15 | 1 marks

15. C

3.	(a)	steeper gradient for Li OR curve/line for Li higher ✓		2
3.	(b)	equal masses «of different substances» do not contain equal amounts/moles ✓		1
3.	(c)	«Avg electronegativity = 1.8 Δ electronegativity = 1.6» % covalent character = 45-55 ✓ ionic ✓		2
3.	(d)	$[:C\equiv C:]^{2-}$ 2- charge ✓ $:C\equiv C:$ ✓		2

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Question	Answers	Notes	Total
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APOLLO

Functional groups: Classification of organic compounds

9 questions

Mark-scheme answers

Chemistry SL | Paper 1A | May 2025 TZ1 | Q12 | 1 marks

12. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q10 | 1 marks

10. C

Chemistry SL | Paper 1A | May 2025 TZ2 | Q14 | 1 marks

14. D

Chemistry SL | Paper 1A | May 2025 TZ3 | Q10 | 1 marks

10. C

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

15. D

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q13 | 1 marks

13. C

Chemistry SL | Paper 1A | Nov 2025 TZ1 | Q15 | 1 marks

15. B

Chemistry SL | Paper 1A | Specimen 2025 | Q12 | 1 marks

12. A

Chemistry SL | Paper 1A | Specimen 2025 | Q14 | 1 marks

14. D