Neap

Final Examination 2021

NSW Year 11 Chemistry

Solutions and marking guidelines

Section I

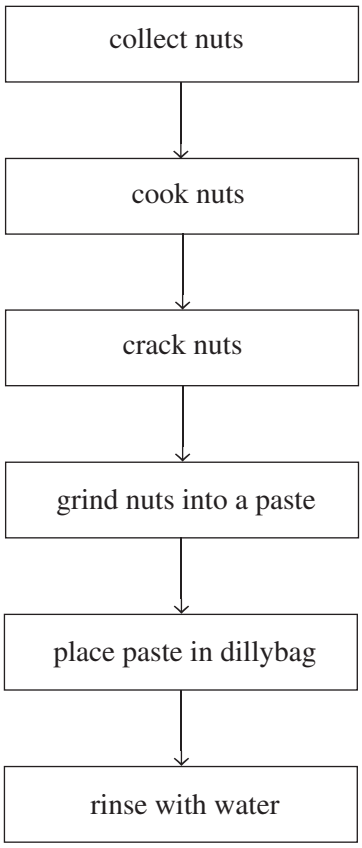
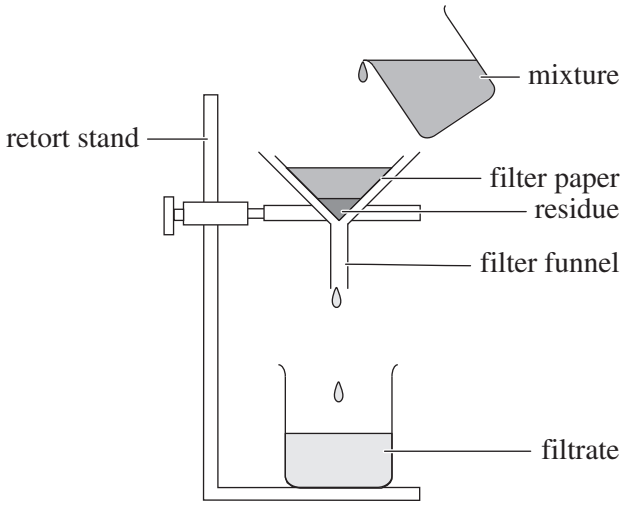
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 1 **C** **C** is correct. Tap water, milk and brass are all homogeneous mixtures as the components of these mixtures are not easily seen due to their uniform composition. **A**, **B** and **D** are incorrect as they contain examples that are not homogeneous (soil, air, blood and wood are heterogeneous).	Mod 1 Properties and Structure of Matter CH11–4 Bands 2–4
Question 2 **C** **C** is correct. The amount of gas generated depends (the dependent variable) on the mass of the reactants. The variable being tested is the mass of the reactants. Their mass is changed, thus mass is the independent variable. The variable that needs to be controlled is temperature, as this would change the amount of gas generated. **A**, **B** and **D** are incorrect. These options do not give the required response.	Mod 3 Reactive Chemistry CH11–2 Bands 2–4
Question 3 **A** **A** is correct. Li_2O is the compound formed. As lithium is a metal, it loses an electron to form a positively charged cation, and as oxygen is a non-metal, it gains two electrons to form a negatively charged ion. **B** is incorrect. It shows the correct formula, but cations do not gain electrons and anions do not lose electrons. **C** and **D** are incorrect as they show incorrect formulas.	Mod 1 Properties and Structure of Matter CH11–7 Bands 2–4
Question 4 **B** **B** is correct. It identifies the calcium ion that has lost the two 4s electrons and the chloride ion that has gained the 3p electron. **A** is incorrect. It identifies the atoms but not the ions. **C** and **D** are incorrect. They have not created the correct cation and anion.	Mod 1 Properties and Structure of Matter CH11–7 Bands 2–4
Question 5 **B** $CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$ 95% of 12.95 g = 12.3025 g $\text{n. } CuCO_3 = \dfrac{12.3025}{(63.55 + 3 \times 16.00 + 12.01)}$ $= 0.099567$ moles 1 : 1 ratio, thus 0.0995 moles CuO. $\text{Mass CuO} = 0.099567 \times (63.55 + 16.00)$ $= 7.92$ g	Mod 2 Introduction to Quantitative Chemistry CH11–6 Bands 4–6
Question 6 **D** $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ Using Gay-Lussac's Law: ratio 1 : 3 : 2 24.00 L : 72.00 L : 48.00 L	Mod 2 Introduction to Quantitative Chemistry CH11–6 Bands 2–4

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 7 A **A** is correct. *K* conducts in a molten state only and has a relatively high boiling point; thus, it is ionic. *L* has a low boiling point and does not conduct electricity; thus, it is covalent molecular. *M* does not conduct electricity and has the highest boiling point, so it is also covalent and a network. *N* conducts electricity in both molten and solid states and so is metallic. **B**, **C** and **D** are incorrect. *K* could not be metallic as it does not conduct in a solid state and it could not be covalent given its electrical conductivity in a molten state. *N* could not be ionic as it conducts in a solid state. *M* could not be ionic as it does not conduct electricity in a molten state.	Mod 1 Properties and Structure of Matter CH11–5 Bands 2–4
Question 8 D Fe has an oxidation state of +2 in $FeCl_2$. $FeCl_2 = 0$ $Fe \times (2 \times -1) = 0$ $Fe = +2$ (green) Fe has an oxidation state of +3 in $FeCl_3$. $FeCl_3 = 0$ $Fe \times (3 \times -1) = 0$ $Fe = +3$ (yellow)	Mod 1 Properties and Structure of Matter CH11–6 Bands 2–4
Question 9 C **C** is correct. *X* is the most active metal, as it displaces both *Y* and *Z*. *Z* then displaces *Y*, so *Y* is the least active metal. **A**, **B**, and **D** are incorrect. These options do not give the required response.	Mod 3 Reactive Chemistry CH11–5 Bands 2–4
Question 10 B **B** is correct. The order of the bond energies is 565, 432, 299. Thus, as the bond energies decrease it would be easiest to decompose them in this descending order. **A** is incorrect. It arranges the bond energies from lowest to highest. This order would be an ascending order of energy required to decompose the molecules. **C** is incorrect as it shows the order 498, 242, 436. **D** is incorrect as it shows the order 436, 242, 498.	Mod 4 Drivers of Reactions CH11–4 Bands 4–6
Question 11 A **A** is correct. According to the results, copper would precipitate in carbonate but not chloride or sulfate. **B** is incorrect. According to the table, potassium does not produce precipitates. **C** is incorrect. Strontium would produce a precipitate in sulfate. **D** is incorrect. Barium would produce a precipitate with sulfate.	Mod 3 Reactive Chemistry CH11–5 Bands 2–4

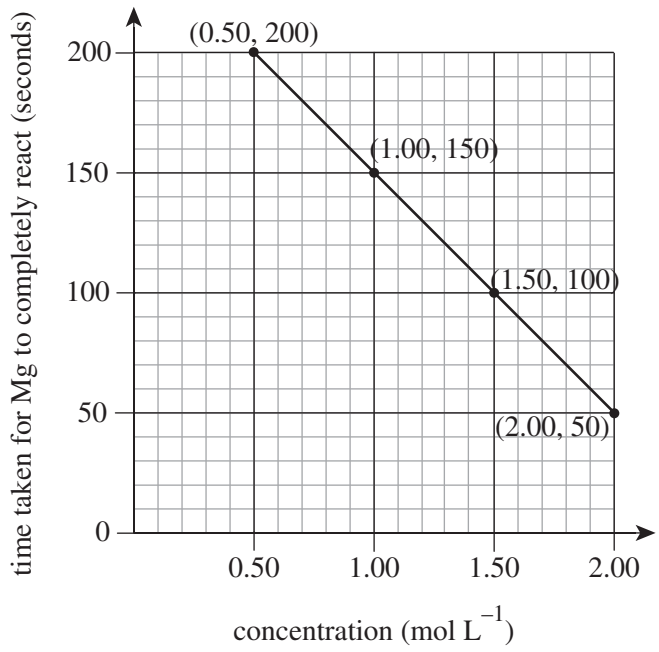
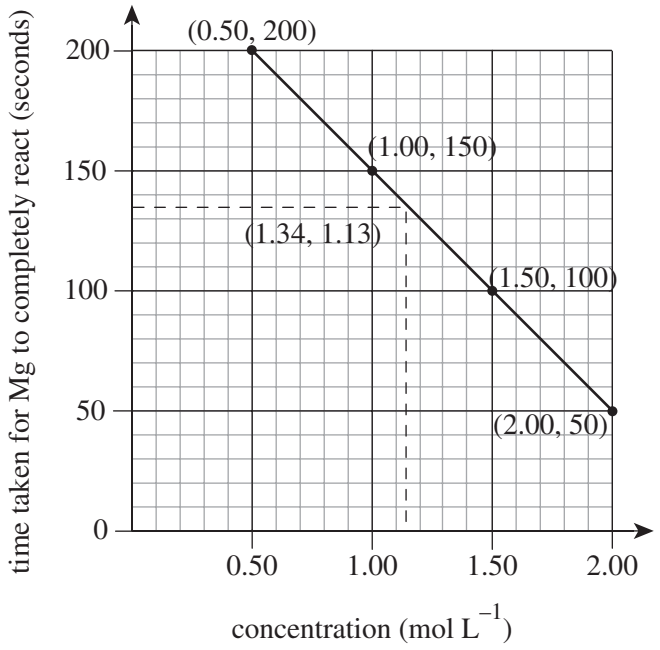
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 12 C **C** is correct. Hydrogen peroxide does not decompose as quickly when at room temperature because of the activation energy needed by the particles. **A** is incorrect. Heat is released during decomposition, so the reaction is exothermic, meaning negative change in enthalpy. **B** is incorrect. As disorder increases with the decomposition more gas molecules are produced. Thus, change in entropy is positive. **D** is incorrect. It can be inferred from the enthalpy and entropy changes that the Gibbs free energy would be negative.	Mod 4 Drivers of Reactions CH11–4 Bands 4–6
Question 13 D $\left(1\times\Delta H°_f\ Na_2CO_3(s)\right)+\left(1\times\Delta H°_f\ H_2O(g)\right)$ $+\left(1\times\Delta°_f\ CO_2(g)\right)-\left(2\times\Delta H°_f\ NaHCO_3(s)\right)$ $=-1131+(-241.8)+(-393.5)-(2\times-947.7)$ $=+129.1\ \text{kJ mol}^{-1}$	Mod 4 Drivers of Reactions CH11–4 Bands 4–6
Question 14 A **A** is correct. I has 0 moles gas to 3 moles of gas, so the equation has increasing entropy. II has 2 moles of gas to 1 mole of gas, so the equation has decreasing entropy. III has 6 moles of gas to 7 moles of gas, so the equation has increasing entropy. **B**, **C**, and **D** are incorrect. These options do not give the required response.	Mod 4 Drivers of Reactions CH11–4 Bands 4–6
Question 15 C $P_1V_1=P_2V_2$ $P_1=P_2\left(V_2/V_1\right)$ $=1.0\ \text{atm}\left(\frac{42.00\ \text{mL}}{11\ \text{mL}}\right)\ \text{OR}\ 1.0\ \text{atm}\left(\frac{0.042\ \text{L}}{0.011\ \text{L}}\right)$ $=3.818\ \text{atm}$ Boyle's Law states that for a given quantity of gas at a constant temperature, the product of its volume and its pressure is constant.	Mod 2 Introduction to Quantitative Chemistry CH11–4 Bands 4–6

Section II

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 16	
(a) $\%\ \text{sand} = \frac{13.35 - 0.85}{17.59} \times \frac{100}{1}$ $= 71.06\%$ $\%\ \text{salt} = \frac{37.98 - 34.02}{17.59} \times \frac{100}{1}$ $= 22.51\%$	Mod 1 Properties and Structure of Matter CH11–6 Bands 2–4 • Calculates the percentage of sand. AND • Calculates the percentage of salt . . . . . 2 • Calculates the percentage of sand. OR • Calculates the percentage of salt 1
(b) The calculations show that the percentages do not equal 100. Some mass (salt) has been lost and, thus, the mass of salt measured is lower than the correct value and the results are not accurate. Hence, the experiment is not valid.	Mod 1 Properties and Structure of Matter CH11–3 Bands 2–4 • Provides concise judgement of the validity of the experiment. AND • Provides reasoning . . . . . 2 • Provides judgement of the validity of the experiment. OR • Provides reasoning 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 17	
(a)  	Mod 3 Reactive Chemistry CH11–10, 11–4, 12–4 Bands 2–4 • Draws the products and processes correctly. AND • Summarises the processes . . . . . 2 • Provides some appropriate information 1
(b)  	Mod 1 Properties and Structure of Matter CH11–8, 11–3, 12–3 Bands 3–4 • Draws a clear diagram with all major components: – retort stand – mixture – filter paper – residue – filter funnel – filtrate AND • Labels diagram appropriately . . . . . 2 • Draws a diagram with at least FOUR of the above components . . . 1

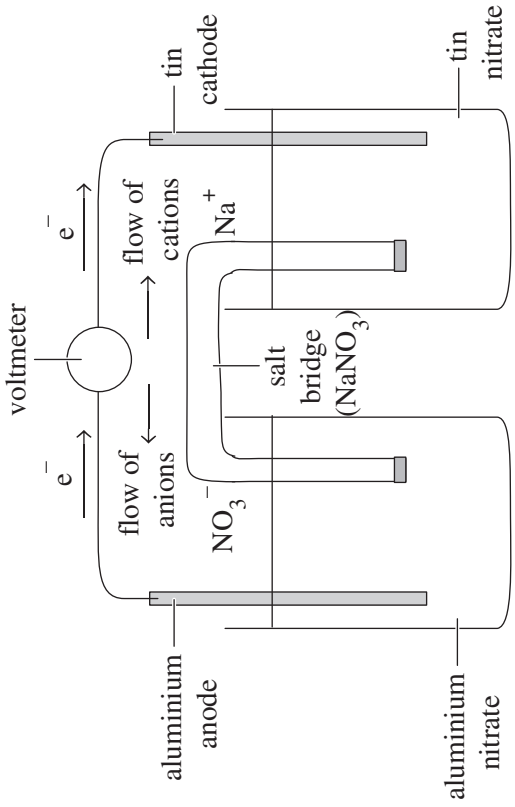
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 18	
(a) Acetic acid and glucose have the same empirical formula of CH_2O. An empirical formula only gives the ratio of the atoms present in simple whole numbers, whereas a molecular formula provides the actual number of each atom present.	Mod 2 Introduction to Quantitative Chemistry CH11–6, 12–7 Bands 4–6 • Provides the empirical formula for acetic acid and glucose. AND • Explains the difference between empirical and molecular formulae. . . . . 2 • Provides the empirical formula for acetic acid and glucose. OR • Explains the difference between empirical and molecular formulae. 1
(b) $C_5H_4O_2$ $\text{mass} = 5\times12.01 + 4\times1.008 + 2\times16$ $= 96.082$ $\frac{288}{96.082} = 3.00$ Thus, the molecular formula is $C_5H_4O_2 \times 3 = C_{15}H_{12}O_6$.	Mod 2 Introduction to Quantitative Chemistry CH11–6 Bands 4–6 • Calculates molar mass from empirical formula. AND • Determines the molar mass is three times larger. AND • Multiplies subscripts by three to correctly identify the molecular formula . . . . . 3 • Any TWO of the above points . . . . . 2 • Any ONE of the above points 1
Question 19	
(a) $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$	Mod 3 Reactive Chemistry CH11–10 Bands 4–6 • Gives the correct balanced equation AND includes states 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)  	Mod 3 Reactive Chemistry CH11–10, 11–4, 12–4 Bands 4–6 • Correctly shows concentration on the *x*-axis and time on the *y*-axis. AND • Draws the line of best fit. AND • Gives correct data points . . . . . 3 --- • Correctly shows concentration on the *x*-axis and time on the *y*-axis. AND • Draws the line of best fit OR gives correct data points . . . . . 2 --- • Correctly shows concentration on the *x*-axis and time on the *y*-axis. OR • Draws the line of best fit. OR • Gives correct data points 1
(c) 134 seconds for time taken, in the range of 1.12–1.15 for concentration.  *Note: Consequential on answer to Question 19 part (b).*	Mod 3 Reactive Chemistry CH11–10 Bands 2–4 • Uses graph to interpolate the value correctly. 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(d)	As concentration of the hydrochloric acid increases, the time taken for the magnesium ribbon to react decreases. This is because there are more acid particles present, and thus the likelihood of collisions between the acid particles and the magnesium increases and the reaction rate increases. *Note: Consequential on answer to Question 19 part (b).*	Mod 3 Reactive Chemistry CH 11–10 Bands 2–4 • Identifies that, as concentration increases, reaction time decreases. AND • Explains the links between the increased concentration and an increase in particles, and the increased likelihood of collisions ..... 2 • Identifies that, as concentration increases, reaction time decreases. OR • Explains the links between the increased concentration and an increase in particles, and the increased likelihood of collisions 1
(e)	The student should wash a 200.00 mL volumetric flask with distilled water only, as if any hydrochloric acid were in the flask, they would not know the final concentration. A 20.00 mL bulb pipette should be rinsed with distilled water to remove impurities and then rinsed with the 2.00 M hydrochloric acid to be diluted, as if any water were left in the pipette it would dilute the acid by an unknown factor. $C_1V_1 = C_2V_2$ $C_1 = 2.00\ \text{M} \quad V_1 = ?$ $C_2 = 0.20 \quad V_2 = 200.00\ \text{mL}\ (0.2\ \text{L})$ $V_1 = 0.2 \times \frac{0.2}{2}$ $= 0.02\ \text{L or } 20.00\ \text{mL}$ Thus, the student would pipette 20.00 mL of the 2.00 M acid and empty it into the 200.00 mL volumetric flask, increasing the volume up to the 200.00 mL line. This would make 0.2 M or a 1-in-10 dilution.	Mod 2 Introduction to Quantitative Chemistry CH 11–6 Bands 2–4 • Identifies the correct volumetric glassware. AND • Explains the reasons for rinsing the volumetric glassware. AND • Gives correct equations. AND • Calculates volume correctly ..... 4 • Any THREE of the above points ... 3 • Any TWO of the above points ..... 2 • Any ONE of the above points 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 20	
5 g samples of each solid should be dissolved in 50 mL of water in a small beaker. Then place graphite electrodes in the solutions connected in a circuit to a light globe; if the light globe turns on, the solution conducts electricity and is sodium chloride. Being ionic, it conducts electricity in solution, as when it dissolves the ions become mobile charge carriers and allow the electrons in the current to flow through. Sucrose, being covalent, is not able to conduct electricity as there are no free electrons (they are all in covalent bonds shared between the atoms). Thus, the light globe will not turn on when placed in the sucrose solution. **OR** A small spoonful of each substance could be placed in a beaker and heated over a Bunsen burner on a tripod with a pipe clay triangle. The sample would be heated in a crucible. The sample that melts most easily is sucrose, as it has a low melting point due to the weaker intermolecular forces between its molecules. This is because the forces require less energy to overcome than the ionic attraction in sodium chloride. The positive and negative ions are held together in a three-dimensional lattice by strong electrostatic attraction. This holds them in a regular geometric arrangement, which requires a lot more energy to overcome. Thus, it will not melt over a Bunsen burner at all.	Mod 1 Properties and Structure of Matter CH11–8 Bands 2–4 • Identifies sucrose as covalent molecular AND sodium chloride as ionic. AND • Outlines ONE method to distinguish the white soluble solids based upon differences in physical properties. AND • Links the test to the physical properties and intermolecular forces within each substance. AND • References equipment and sensible quantities in a school laboratory . . . . . 4 • Any THREE of the above points . . . 3 • Any TWO of the above points . . . . . 2 • Gives some relevant information . . . 1

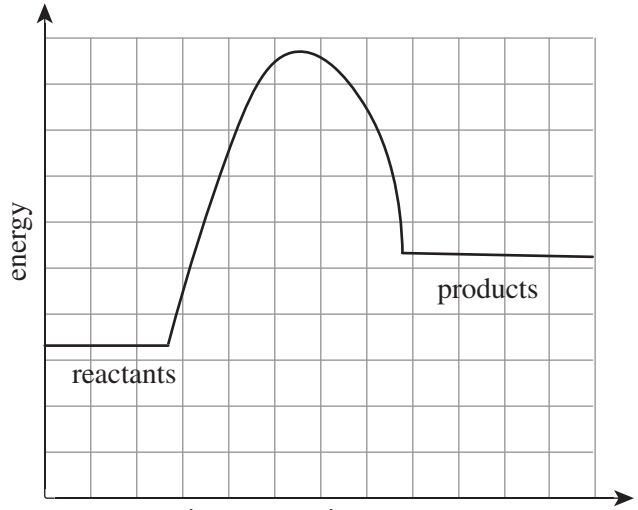
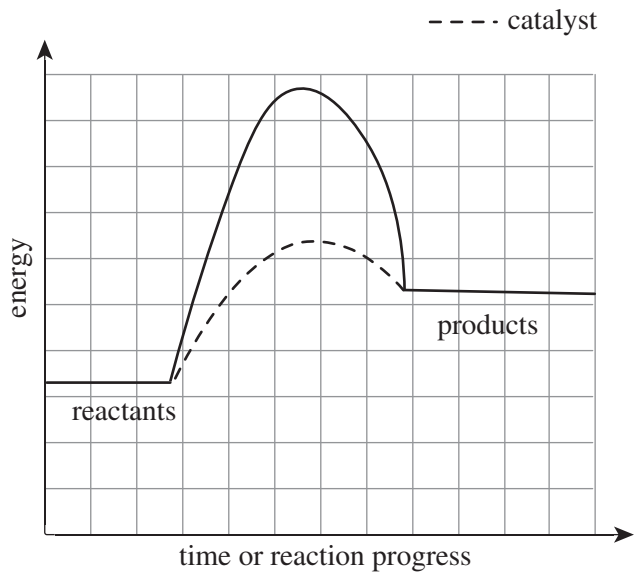
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 21	
The first ionisation energy for period 3 graph shows a general increase in the first ionisation energy of the elements from the left-hand side to the right-hand side. Sodium has the lowest ionisation energy at approximately 500 kJ mol^{-1} and is a very active metal with only one electron in its outer shell. It does not take as much energy to remove this one outer electron as it does to remove the valence electrons from atoms like chlorine and argon on the right-hand side of the period. Argon has the highest ionisation energy and requires a lot more energy to remove valence electrons, as they are very attracted to the protons in the nucleus due to strong electrostatic attraction. Argon does not react and is not found in compounds as a result. The Atomic radii of period 3 elements graph also explains the properties of the elements in period 3, as from the left-hand side to the right-hand side the atomic radius decreases. Electrons are in the same shell, but as the electrostatic attraction between the valence electrons and the nucleus increases, the radius decreases. Thus, elements on the right-hand side such as chlorine and argon have the smallest radii and the outer electrons are held strongly (when chlorine reacts it gains electrons). Electronegativity is the affinity of a nucleus to hold its electrons, and as the atomic radius decreases and the number of valance electrons increases across period 3, the electronegativity also increases. Sodium has the lowest electronegativity and the lowest ionisation energy; thus, it easily loses its outer electrons during reactions. On the right-hand side of the row, the non-metal chlorine gains electrons very easily in chemical reactions. It can be found in ionic substances where it gains electrons or in forming covalent bonds in substances due to its very high electronegativity. As atomic radii decreases, electronegativity increases and first ionisaton energy increases.	Mod 1 Properties and Structure of Matter CH11–8, 11–7, 12–7 Bands 2–4 • Analyses the data in the first ionisation energy for period 3 graph. AND • Analyses the data in the Atomic radii of period 3 elements graph. AND • Analyses the data in the Electronegativity in period 3 graph. AND • Describes the properties of the elements across period 3. AND • Shows that the trends are linked to each other . . . . . 5 • Any FOUR of the above points . . . . 4 • Any THREE of the above points . . . 3 • Any TWO of the above points . . . . . 2 • Gives some relevant information . . . 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 22	
(a) 	Mod 3 Reactive Chemistry CH11–4, 11–6 Bands 4–6 • Draws a clear diagram. AND • Correctly labels all of: – electrolytes – aluminium anode – tin cathode – electron flow from anode to cathode – anions to anode – cations to cathode – salt bridge – voltmeter. . . . . 4 • Draws a diagram. AND • Correctly labels at least FOUR of the above points. . . . . 3 • Draws a diagram. AND • Correctly labels at least THREE of the above points . . . . . 2 • Gives some relevant information. . . 1
(b) $2Al(s) + 3Sn^{2+}(aq) \rightarrow 2Al^{3+}(aq) + Sn(s)$ $2Al(s) \rightarrow 2Al^{3+}(aq) + 6e^-$ oxidation $3Sn^{2+}(aq) + 6e^- \rightarrow 3Sn(s)$ reduction From the data sheet (standard potentials): $\text{reduction} - \text{oxidation} = -0.14\text{ V} - (-1.68\text{ V})$ $= 1.54\text{ V}$ **OR** $1.68 + (-0.14) = 1.54\text{ V}$	Mod 3 Reactive Chemistry CH11–4, 11–6 Bands 2–4 • Gives the correct redox equation. AND • Identifies the correct values from data sheet. AND • Gives correct calculation for emf of this cell. . . . . 2 • Shows at least ONE relevant step . . 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 23	
(a) $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$ moles SO_2: $\frac{14.57}{32.07 + (2 \times 16)} = \frac{14.57}{64.07}$ $= 0.22741$ moles 2 : 2 ratio. Thus, 0.22741 moles of SO_3 can form. mass of $SO_3 = 0.22741 \times (32.07 + 3 \times 16.00)$ $= 0.22741 \times 80.07$ $= 18.21$ g (four significant figures)	Mod 2 Introduction to Quantitative Chemistry CH11–6 Bands 4–6 • Gives a correct, balanced chemical equation. AND • Calculates moles of sulfur dioxide. AND • Correctly calculates the mass of sulfur trioxide. AND • Gives answer to four significant figures . . . . . 2 • Gives a correct, balanced chemical equation. OR • Calculates moles of sulfur dioxide and oxygen. OR • States that sulfur dioxide is the limiting reagent. OR • Correctly calculates the mass of sulfur trioxide. AND • Gives answer to three significant figures 1
(b) 	Mod 1 Properties and Structure of Matter CH11–7 Bands 2–4 • Draws a Lewis dot diagram for water. AND • Draws a Lewis dot diagram for carbon dioxide. . . . . 2 • Draws a Lewis dot diagram for water. OR • Draws a Lewis dot diagram for carbon dioxide. 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(c)	Water has a much higher boiling point due to its polar nature and the presence of hydrogen bonds between its molecules. These bonds are stronger than the dispersion forces between carbon dioxide molecules and thus they require more energy to overcome. *Note: Students may also draw the hydrogen bonds between water molecules to support their response.*	Mod 1 Properties and Structure of Matter CH11–7 Bands 2–4 • Identifies that water has a higher boiling point because it is polar and has hydrogen bonds. AND • Identifies that carbon dioxide has a lower boiling point because it has dispersion forces between molecules . . . . . 2 • Identifies that water has a higher boiling point because it is polar and has hydrogen bonds. OR • Identifies that carbon dioxide has a lower boiling point because it has dispersion forces between molecules 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 24	
(a) Calculate Δ entropy for the reaction: $\Delta S^{\ominus} = \left(S^{\ominus}CO_2(g) + 2S^{\ominus}NH_3(g)\right) - \left(S^{\ominus}CO(NH_2)_2(s) + S^{\ominus}H_2O(l)\right)$ $= \left[(1\times 213.6) + (2\times 192.5)\right] - \left[(1\times 104.6) + (1\times 69.96)\right]$ $= 598.6 - 174.6$ $= 424.0 \text{ J mol}^{-1}\text{K}^{-1}$ Positive entropy indicates an increase in entropy, which is to be expected as 3 moles of gas have been formed from liquid reactants. The positive entropy drive favours the reaction as written. Calculate Δ enthalpy for the reaction: $\Delta H^{\ominus} = \left(\Delta H^{\ominus}CO_2(g) + 2\Delta H^{\ominus}NH_3(g)\right) - \left(\Delta H^{\ominus}CO(NH_2)_2(s) + \Delta H^{\ominus}H_2O(l)\right)$ $= \left[(1\times -393.5) + (2\times -46.19)\right] - \left[(1\times -333.19) + (1\times -285.9)\right]$ $= (-485.88) - (-619.09)$ $= +133.21 \text{ kJ mol}^{-1}$ Positive enthalpy indicates an endothermic reaction. Calculate standard Gibbs free energy: $\Delta G^{\ominus} = \Delta H^{\theta} - T\Delta s^{\ominus}$ $= 133.2\times 10^3 - \left[(25 + 273.15)\times (424.0)\right]$ $= 133.2 - 126.4$ $= 6.8 \text{ kJ mol}^{-1}$ $\Delta G^{\ominus}$ is positive, suggesting that the reaction is not spontaneous as given. However, as the entropy drive is larger, it is likely to occur if the mixture is continually heated, as increased temperature would provide the energy needed for the reaction to continue given it is endothermic in the direction as written. The reactants require energy to overcome the activation energy and react; an input of energy would provide this.	Mod 4 Drivers of Reactions CH11–7 Bands 4–6 • Correctly calculates $S^{\ominus}$. AND • Correctly calculates $H^{\ominus}$. AND • Correctly calculates $G^{\ominus}$. AND • States that the increase in entropy favours the reaction. AND • States that the positive enthalpy indicates an endothermic reaction. AND • States that the positive Gibbs free energy indicates the reaction would not be spontaneous as written . . . . . 6 • Any FIVE of the above points . . . . . 5 • Any FOUR of the above points . . . . 4 • Any THREE of the above points . . . 3 • Any TWO of the above points . . . . . 2 • Gives some relevant information . . . 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)  	Mod 4 Drivers of Reactions CH11–7 Bands 4–6 • Labels the reactants and products. AND • Labels the activation energy. AND • Draws a smooth, clean line demonstrating endothermic reaction. AND • Labels the axes . . . . . 2 • Any TWO of the above points. . . . 1
(c)  *Note: Consequential on answer to Question 24 part (b).*	Mod 4 Drivers of Reactions CH11–4, 11–5, 11–6 Bands 4–6 • Shows that the catalyst lowers activation energy 1
Question 25	
(a) $Cu(s) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$	Mod 3 Reactive Chemistry CH 11–10 Bands 2–4 • Gives correct, balanced net ionic equation. 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)	The copper is a more active metal than silver and has thus displaced the silver ions from the $AgCH_3COO$ solution. As the Cu^{2+} ions went into the solution, it became blue in colour and the Ag^{+} ions came out of the solution and deposited as Ag(s) on the copper wire, giving it a shiny silver appearance.	Mod 3 Reactive Chemistry CH 11–10 Bands 2–4 • Explains the displacement reaction. AND • Identifies the deposition of silver metal. AND • Identifies that the formation of the copper ions is the source of the blue colour . . . . . 2 • Gives some relevant information . . . 1
(c)	$\text{moles of copper} = \frac{5.15 - 4.50}{63.55}$ $= 0.010228$ $\text{moles of silver} = 2 \times 0.010228$ $= 0.020456$ $\text{solution concentration in 100.00 mL} = \frac{0.020456}{0.1}$ $= 0.2046 \text{ mol L}^{-1}$	Mod 2 Introduction to Quantitative Chemistry CH 11–9 Bands 4–6 • Calculates moles of copper correctly. AND • Calculates moles of silver correctly. AND • Calculates the concentration of the solution in 100.00 mL. . . . . 3 • Any TWO of the above points . . . . . 2 • Any ONE of the above points 1