Mark Scheme (Results)

October 2024

Pearson Edexcel International Advanced Subsidiary Level in Chemistry (WCH12) Paper 01 Energetics, Group Chemistry, Halogenoalkanes and Alcohols

Section A

Question Number	**Answer**	**Mark**
1(a)	**The only correct answer is C (**the peak becomes lower and further to the right) ***A*** *is not correct because the peak becomes lower* ***B*** is *not correct because the peak becomes lower and moves further to the right* ***D*** *is not correct because the peak moves further to the right*	(1)

Question Number	**Answer**	**Mark**
1(b)	**The only correct answer is C** (the activation energy moves to the left and the peak stays the same) ***A*** *is not correct as the activation energy would move to the left* ***B*** *is not correct as the peak would not move to the right* ***D*** *is not correct as the activation energy would move to the left and the peak stays the same*	**(1)**

Question Number	**Answer**	**Mark**
2(a)	**The only correct answer is D (**rate decreases, yield decreases) ***A*** *is not correct because the rate and yield would decrease* ***B*** *is not correct because the rate would decrease* ***C*** *is not correct because the yield would decrease*	**(1)**

Question Number	Answer	Mark
2(b)	**The only correct answer is B (**rate increases, yield decreases) ***A** is not correct because the yield would decrease* ***C** is not correct because the rate would increase and the yield decrease* ***D** is not correct because the rate would increase*	**(1)**

Question Number	Answer	Mark
2(c)	**The only correct answer is C** (416) ***A** is not correct because only one H_2 has been included in the calculation* ***B** is not correct because a value of – 206 was used as the enthalpy change* ***D** is not correct because only one O-H bond has been included in the calculation*	**(1)**

Question Number	Answer	Mark
3	**The only correct answer is D** ($Cu(s) + C(s) + 1½O_2(g) \rightarrow CuCO_3(s)$) ***A** is not correct because the oxygen is not in its standard state* ***B** is not correct because the equation has been doubled* ***C** is not correct because the copper and carbon are not in their standard states*	**(1)**

Question Number	Answer	Mark
4	**The only correct answer is D** (the first ionisation energy of magnesium is greater than that of calcium) ***A*** *is not correct because calcium hydroxide is more soluble than magnesium hydroxide in water* ***B*** *is not correct because not all Group 2 metals give a characteristic flame test colour* ***C*** *is not correct because magnesium carbonate does thermally decompose when heated*	**(1)**

Question Number	Answer	Mark
5	**The only correct answer is A** (calcium carbonate) ***B*** *is not correct because it would give off a brown gas* ***C*** *is not correct because it would give a yellow flame and not thermally decompose* ***D*** *is not correct because it would give off a brown gas*	**(1)**

Question Number	Answer	Mark
6	**The only correct answer is D** (electrons emit energy as they drop to a lower energy level) ***A*** *is not correct because this does not produce the flame colour* ***B*** *is not correct because electrons do not emit energy when jumping to a higher energy level* ***C*** *is not correct because electrons do not absorb energy when they drop down to a lower energy level*	**(1)**

Question Number	Answer	Mark
7	**The only correct answer is A** (20 cm^3 of 0.25 mol dm^{-3} sulfuric acid) **B** *is not correct because this contains twice as many moles of sulfuric acid for neutralisation* ***C*** *is not correct because this contains four times as many moles of sulfuric acid for neutralisation* ***D*** *is not correct because this contains twice as many moles of sulfuric acid for neutralisation*	**(1)**

Question Number	Answer	Mark
8	**The only correct answer is B** (9×10^{22}) ***A*** *is not correct because the number of moles has not been multiplied by 3* ***C*** *is not correct because the number of moles has been multiplied by 4* ***D*** *is not correct because the number of moles has been multiplied by 5*	**(1)**

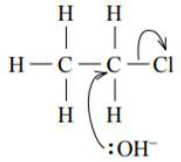
Question Number	Answer	Mark
9	**The only correct answer is D** ($KHSO_4$) ***A*** *is not correct because chlorine is not a product* ***B*** *is not correct because sulfur is not a product* ***C*** *is not correct because hydrogen sulfide is not a product*	**(1)**

Question Number	**Answer**	**Mark**
10	**The only correct answer is C** (purple) ***A*** *is not correct because in an organic solvent iodine is not blue-black* ***B*** *is not correct because in an organic solvent iodine is not grey* ***D*** *is not correct because in an organic solvent iodine is not yellow*	**(1)**

Question Number	**Answer**	**Mark**
11	**The only correct answer is A** (hexane) ***B*** *is not correct because pentane has a lower boiling temperature as it has fewer electrons* ***C*** *is not correct because 2-methylpentane has a lower boiling temperature as it is branched* ***D*** *is not correct because 2,3-dimethylbutane has a lower boiling temperature as it is branched*	**(1)**

Question Number	**Answer**	**Mark**
12	**The only correct answer is B** (4-methylhexan-3-ol) ***A*** *is not correct because the compound is 4-methylhexan-3-ol* ***C*** *is not correct because the compound is 4-methylhexan-3-ol* ***D*** *is not correct because the compound is 4-methylhexan-3-ol*	**(1)**

Question Number	Answer	Mark
13(a)	**The only correct answer is B** (nucleophile) ***A*** *is not correct because the hydroxide ion is not acting as a reducing agent* ***C*** *is not correct because the hydroxide ion is not acting as an electrophile* ***D*** *is not correct because the hydroxide ion is not acting as a base*	**(1)**

Question Number	Answer	Mark
13(b)	**The only correct answer is C**  ***A*** *is not correct because this is not the correct movement of the electrons* ***B*** *is not correct because this is not the correct movement of the electrons* ***D*** *is not correct because this is not the correct movement of the electrons*	**(1)**

Question Number	Answer	Mark
14(a)	**The only correct answer is D** (propanone) ***A*** *is not correct because propan-1-ol would give a colour change with acidified potassium dichromate(VI)* ***B*** *is not correct because propan-2-ol would give a colour change with acidified potassium dichromate(VI)* ***C*** *is not correct because propanal would give a colour change with acidified potassium dichromate(VI)*	**(1)**

Question Number	Answer
14(b)	**The only correct answer is A** (propan-1-ol) ***B*** *is not correct because propan-2-ol would not give a peak at m/z 31* ***C*** *is not correct because propanal would not give a peak at m/z 31or m/z 60* ***D*** *is not correct because propanone would not give a peak at m/z 31or m/z 60*

Question Number	Answer	Mark
15	**The only correct answer is C** (a carboxylic acid) ***A*** *is not correct because the spectrum shows a peak for an O-H group* ***B*** *is not correct because the spectrum shows a peak for a C=O group* ***D*** *is not correct because the spectrum shows a peak for an O-H group*	**(1)**

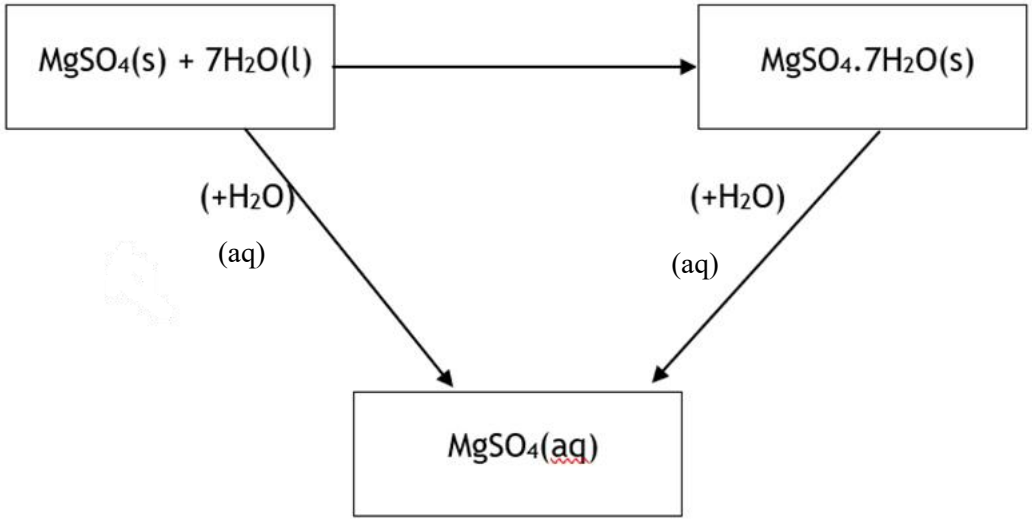
TOTAL FOR SECTION A = 20 MARKS

Section B

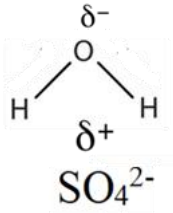
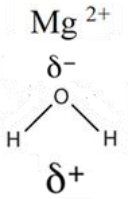
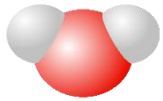
Question Number	Answer	Additional Guidance	Mark
16(a)(i)	An answer that makes reference to the following point: • **heat** to constant mass /**heat** until no change in mass	 Allow weight for mass Ignore just constant mass Ignore until no more steam is given off Ignore heat for a long time Ignore any test for water Ignore dry with a filter paper Do not award any drying agent	**(1)**

Question Number	Answer	Additional Guidance	Mark
16(a)(ii)	• calculation of mass **and** moles of H_2O **(1)** • calculation of moles of $MgSO_4$ **(1)** • calculation of 1:1 ratio so x = 1 **(1)** Alternative calculations 6.04 ÷ 120.4 = 0.05017 (mol) **(1)** 6.92 ÷ 0.05017 = 137.94 and 137.94 – 120.4 = 17.54 **(1)** 17.54 ÷ 18 = 0.97454 = 1:1 so x =1 **(1)** OR 6.04 ÷ 120.4 = 0.5017 (mol) **(1)** 0.88 ÷ 0.05017 = 17.5 **(1)** 17.54 ÷ 18 = 0.97454 = 1:1 so x =1 **(1)** OR 6.04 ÷ 120.4 = 0.05017 (mol) **(1)** 6.92 ÷ 0.05017 = 137.94 and 120 + 18x = 137.94 **(1)** x =1 **(1)**	Example of calculation: 6.92 – 6.04 = 0.88 g 0.88 ÷ 18 = 0.048889/ 4.8889 ×10 $^{-2}$ (mol) 6.04 ÷ 120.4 = 0.050166/ 5.0166 ×10 $^{-2}$ (mol) 0.048889 ÷ 0.050166 ÷ = 0.97454 = 1:1 so x =1 Or 0.050166 ÷ 0.048889 = 1.0261 = 1:1 so x =1 Allow just 1:1 Ignore intermediate rounding to 1SF Do not award more than 1 SF for x Allow TE throughout	**(3)**

Question Number	Answer		Additional Guidance	Mark
16(b)(i)				(4)
			<u>Example of calculation:</u>	
	• temperature change	**(1)**	29.4 – 16.6 = 12.8 (^{o}C)	
	• energy change	**(1)**	100 × 4.18 × 12.8 = 5350.4/5.3504 × 10^{3} (J)/ 5.3504 (kJ)	
	• enthalpy change per mole	**(1)**	5350.4 (J) ÷ 0.0628 = 85197/8.5197 × 10^{4} (J mol $^{-1}$) Or 5.3504 (kJ) ÷ 0.0628 = 85.197 (kJ mol $^{-1}$)	
	• correct sign and units and 2 or 3 SF	**(1)**	– 85200 J mol $^{-1}$ /– 85000 J mol $^{-1}$/– 85.2 k J mol $^{-1}$ /– 85 k J mol $^{-1}$ Allow just mol $^{-}$ for mol $^{-1}$ Allow use of 4.2 instead of 4.18 Ignore case of J TE throughout Correct answer with sign and units and 2-3 SF scores 4	

Question Number	Answer	Additional Guidance	Mark
16(b)(ii)	A diagram that shows • both arrows pointing down **(1)** • correct species and states in the bottom box **(1)**	Example of diagram  Allow ions separated e.g. $Mg^{2+}(aq)$ and $SO_4^{2-}(aq)$ Ignore any additional water in the bottom box eg $7H_2O$ Ignore the values on arrow even if incorrect Do not award $MgSO_4$ + (aq)	**(2)**

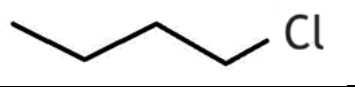
Question Number	Answer	Additional Guidance	Mark
16(b)(iii)	• correct use of data **(1)** • correct sign and answer **(1)**	<u>Example of calculation:</u> (+) – 85.2 (kJ mol $^{-1}$) (–) + 15.8 (kJ mol $^{-1}$) – 101 (kJ mol $^{-1}$) + 101 (kJ mol $^{-1}$) score 1 Ignore units unless wrong and if mixed units are used max 1. Ignore SF TE on (b)(i) but no TE on an incorrect cycle in (b)(ii)	**(2)**

Question Number	Answer	Additional Guidance	Mark
16(c)(i)	An answer that makes reference to the following points: • diagram showing the H of water molecule adjacent to the sulfate ion  **(1)** • diagram showing O of the water molecule adjacent to the magnesium ion  **(1)**	Correct dipole on water must be seen at least once and the delta + and delta– can be seen on 2 different water molecules/ 2 different diagrams Allow any number of water molecules Allow just different sized unlabelled circles for water molecules or unlabelled ball and stick diagrams  Allow one water molecule attracted to both ions Penalise wrong charges on the ions only once Penalise missing dipoles or a full charge not a dipole only once Penalise labelled hydrogen bond only once	**(2)**

Question Number	Answer	Additional Guidance	Mark
16(c)(ii)	An answer that makes reference to the following points: • (the barium ions are removed from solution by) precipitation of insoluble barium sulfate **(1)** • ionic equation with all state symbols **(1)**	Allow the barium ions precipitate out Allow insoluble barium sulfate is formed Allow solid barium sulfate is formed Ignore any reference to displacement/neutralisation reactions Ignore the non-toxicity of barium sulfate $Ba^{2+}(aq) + SO_4^{2-}(aq) \longrightarrow BaSO_4(s)$ Do not award if any other ions are present eg Mg^{2+} on both side of the equation	**(2)**

(Total for Question 16 = 16 Marks)

Question Number	Answer	Additional Guidance	Mark
17(a)(i)	An answer that makes reference to the following point: • 2-iodo-(2)-methylpropane	Allow 2-methyl-2-iodopropane Allow 2,2 iodomethylpropane Ignore missing hyphens Ignore gaps Ignore commas instead of hyphens Do not award 2-iodine -2-methylpropane Do not award 2-iodino -2-methylpropane	**(1)**

Question Number	Answer	Additional Guidance	Mark
17(a)(ii)	An answer that makes reference to the following point: • 	Ignore angles/ length of bonds	(1)

Question Number	Answer	Additional Guidance	Mark
17(b)(i)	An answer that makes reference to the following points: • observation with **A** **(1)** yellow precipitate/ solid • observation with **B** **(1)** white precipitate/ solid	Allow ppt/ppte or near miss spellings Allow precipitation Ignore formula even if incorrect Yellow solution and white solution score 1 Precipitation colours reversed score 1 Do not award with any other wrong observations eg steamy fumes. Ignore any further tests on the ppt e.g. addition of ammonia	(2)

Question Number	Answer	Additional Guidance	Mark
17(b)(ii)	An answer that makes reference to the following points: • **A** is a tertiary (halogenoalkane) **and B** is a primary one **(1)** • the C-I bond is weaker than the C-Cl bond (so **A** reacts faster) **(1)**	Allow reverse argument for both points Accept **A** reacts via a tertiary carbocation and **B** reacts via a primary one Allow just tertiary reacts faster than primary Do not award **A** is a tertiary carbocation **and B** is a primary one Do not award tertiary halogenoalkane is more stable Accept C-I bond enthalpy is less than C-Cl Allow C-I bond easi**er** to break Ignore just C-I is easy to break/weak as there must be a comparison. Ignore any references to iodine/chlorine eg electronegativity /reactivity Ignore S_N1 faster than S_N2	**(2)**

Question Number	Answer	Additional Guidance	Mark
17(c)(i)	An answer that makes reference to the following points: • $C_4H_9Cl + KCN \longrightarrow C_4H_9CN + KCl$ **(1)** • pentanenitrile **(1)**	Allow ionic equation $C_4H_9Cl + CN^- \longrightarrow C_4H_9CN + Cl^-$ Allow displayed, molecular, full structural or skeletal formula Ignore state symbols even if incorrect Allow pentane nitrile Allow pentanonitrile Allow pentane-1-nitrile Allow pentannitrile (missing the e) Allow pentanitrile (missing n and e)	**(2)**

Question Number	Answer	Additional Guidance	Mark
17(c)(ii)	An answer that makes reference to the following point: • it is a way of extending the carbon chain/ adding extra carbon(s)		**(1)**

(Total for Question 17 = 9 Marks)

Question Number	Answer	Additional Guidance	Mark
18(a)	• conversion of temperature to K **and** conversion of kPa to Pa **(1)** • conversion of cm^3 to m^3 **(1)** • rearrangement of ideal gas equation **(1)** • calculation of n **(1)** • calculation of relative molecular mass **(1)**	Example of calculation: 95 + 273 = 368 99 × 1000 = 99000 (Pa) $81 \times 10^{-6} = 8.1 \times 10^{-5}$ (m^3) $n = \frac{pV}{RT}$ $\frac{99000 \times 8.1 \times 10^{-5}}{8.31 \times 368} = 2.6222 \times 10^{-3}$ (mol) $\frac{0.12}{2.6222 \times 10^{-3}} = 45.763$ (g mol^{-1}) TE throughout Ignore intermediate rounding Ignore SF except 1 Correct answer with some working scores 5	**(5)**

Question Number	Answer	Additional Guidance	Mark
18(b)	An answer that makes reference to the following point: • ethanol/ $CH_3CH_2OH/C_2H_5OH/C_2H_6O$	Accept methoxymethane/CH_3OCH_3 Allow dimethyl ether Allow TE from (a) provided it is a formula that could exist	**(1)**

(Total for Question 18 = 6 Marks)

Question Number	Answer	Additional Guidance	Mark
19(a)(i)	An answer that makes reference to the following points: • instantaneous/temporary dipole **and** formed by asymmetrical distribution of charge/ random arrangement of **electrons** **(1)** • (these produce) induced dipoles OR description of induction **(1)**	Allow electron cloud is distorted Ignore references to atoms/molecules/elements Ignore references to atoms/molecules /elements	**(2)**

Question Number	Answer	Additional Guidance	Mark
19(a)(ii)	An answer that makes reference to the following point: • (hydrogen iodide has) more electrons	Ignore bigger atom/molecule Allow iodine/iodide has more electrons Do not award if other additional wrong answer are given e.g. more polarising/more bonds/more protons/more electronegative	**(1)**

Question Number	Answer	Additional Guidance	Mark
19(a)(iii)	An answer that makes reference to the following point: • hydrogen fluoride has hydrogen bonding (the strongest intermolecular force)	 Allow H bonds Ignore other intermolecular forces e.g. London forces Do not award if the hydrogen bond is clearly intramolecular	**(1)**

Question Number	Answer		Additional Guidance	Mark
19(b)(i)	An answer that makes reference to the following points: • chlorine / Cl_2 / same species / element / atom is oxidised **and** reduced (in the same reaction)	**(1)**		**(3)**
	There are 4 scoring points chlorine is oxidised forming HOCl /OCl^- /chlorate(I) changing oxidation number from 0 to +1 chlorine is reduced forming HCl / Cl^- / chloride changing oxidation number from 0 to −1	**(2)**	Oxidation numbers may be written in the equation and can be written as charges If oxidation and reduction is reversed award one pt for pts 1 and 3. All 4 points = 2 marks 2-3 points = 1 mark	

Question Number	Answer	Additional Guidance	Mark
19(b)(ii)	An answer that makes reference to the following points: • shifting eqm to the right (to make more HCl/HOCl) **(1)** • because (NaOH would) react/ remove the HCl/H^+ (and HOCl) **(1)**	Allow favours Allow equations Moves to the left **and** as the NaOH reacts with Cl_2 will score 1	**(2)**

(Total for Question 19 = 9 Marks)

Section C

Question Number	Answer	Additional Guidance	Mark
20(a)(i)	• correct balanced equation **(1)** • correct state symbols **(1)**	Example of equation $Li(s) + H_2O(l) \longrightarrow LiOH(aq) + \frac{1}{2}H_2(g)$ Allow multiples M2 dependent on M1 or having the correct species in an unbalanced equation	**(2)**

Question Number	Answer	Additional Guidance	Mark
20(a)(ii)	An answer that makes reference to the following points: • bubbles (of gas)/ fizzing/ effervescence **(1)** • Li or solid disappears/ disintegrates /gets smaller OR Li floats on water/moves on the water **(1)**	Ignore just hydrogen/gas produced Allow Li or solid dissolves Ignore just exothermic/ temperature increase/gets warmer Ignore it melts Ignore it catches fire Ignore misty fumes Do not award white ppt/ (white)smoke	**(2)**

Question Number	Answer	Additional Guidance	Mark
20(b)	An answer that makes reference to the following points: • Li reacts with nitrogen from the **air** **(1)** • formula of lithium nitride **(1)**	Allow it reacts with N_2 and O_2 from the air Allow N_2 from the air oxidises the Li Li_3N Ignore equations even if incorrect	**(2)**

Question Number	Answer	Additional Guidance	Mark
20(c)(i)	Example of equation • $C_6Li + CoO_2 \longrightarrow LiCoO_2 + C_6$	Allow multiples Ignore any working Do not award 6C Do not award uncancelled electrons/Li^+	**(1)**

Question Number	Answer	Additional Guidance	Mark
20(c)(ii)	An answer that makes reference to the following points: • Reduction (of cobalt) **(1)** • the oxidation number (of cobalt) changes from +4 to +3 **(1)**	Allow it is an oxidising agent Ignore reference to the gain of electrons by Li^+	**(2)**

Question Number	Answer	Additional Guidance	Mark
20(c)(iii)	An answer that makes reference to the following point: • (the separator is porous/permeable and) allows ions/ Li^+/ to pass through	Allow electrons cannot pass through Ignore inert/unreactive Ignore insulator Do not award electrons can pass through	**(1)**

Question Number	Answer	Additional Guidance	Mark
20(d)(i)	• moles of Li **(1)** • % Al and moles of Al **(1)** • calculation of ratio **(1)** Allow the use of 7 for the relative atomic mass of Li	Example of calculation 2.45 ÷ 6.9 = 0.35507 (mol) 100 – 2.45 = 97.55 ÷ 27.0 = 3.6130 (mol) 3.6130 ÷ 0.35507 = 10.175:1/10:1 Or 1:0.098 Allow $Al_{10}Li$ 1:10 or 0.098:1 will also score 3 if it is clear the ratio refers to Li:Al. If not score 2. Allow the use of 7 for the relative atomic mass of Li giving 0.35 (mol) and a ratio of 10.32:1 Intermediate rounding to 1SF resulting in a ratio of 9: 1 will score 2 Correct answer with some working score 3 If no other marks are awarded a ratio by mass of 97.55 : 2.45 giving 40:1 scores 1 Ignore SF	**(3)**

Question Number	Answer	Additional Guidance	Mark
20 (d)(ii)	An answer that makes reference to the following point: • Either makes the alloy stronger Or (being less dense than Al, the Li would make) the alloy less dense(so would make the aircraft lighter so less fuel used)	There must be a comparison Accept harder/more rigid Allow reverse argument eg pure Al is weaker Allow it is lighter Ignore reactivity/ malleable/durable/ melting point	**(1)**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th></tr>
<tr>
<td>*20(e)</td>
<td>
This question assesses the student's ability to show a coherent and logically structured Answer with linkages and fully sustained reasoning. Marks are awarded for indicative content and for how the Answer is structured and shows lines of reasoning.
The following table shows how the Marks should be awarded for indicative content.

<table>
<tr><th>Number of indicative Marking points seen in Answer</th><th>Number of Marks awarded for indicative Marking points</th></tr>
<tr><td>6</td><td>4</td></tr>
<tr><td>5-4</td><td>3</td></tr>
<tr><td>3-2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
<tr><td>0</td><td>0</td></tr>
</table>

The following table shows how the Marks should be awarded for structure and lines of reasoning.

<table>
<tr><th></th><th>Number of Marks awarded for structure of Answer and sustained lines of reasoning</th></tr>
<tr><td>Answer shows a coherent logical structure with linkages and fully sustained lines of reasoning demonstrated throughout</td><td>2</td></tr>
<tr><td>Answer is partially structured with some</td><td>1</td></tr>
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<td>
Guidance on how the Mark scheme should be applied.
The Mark for indicative content should be added to the Mark for lines of reasoning. For example, a response with five indicative Marking points that is partially structured with some linkages and lines of reasoning scores 4 Marks (3 Marks for indicative content and 1 Mark for partial structure and some linkages and lines of reasoning).

If there were no linkages between the points, then the same indicative Marking points would yield an overall score of 3 Marks (3 Marks for indicative content and no Marks for linkages).

In general it would be expected that 5 or 6 indicative points would get 2 reasoning Marks, and 3 or 4 indicative points would get 1 Mark for reasoning, and 0, 1 or 2 indicative points would score zero Marks for reasoning.
If there is any incorrect chemistry, deduct Mark(s) from the reasoning. If no reasoning Mark(s) awarded do not deduct Mark(s).
Comment: Look for the indicative Marking points first, then consider the Mark for the structure of the Answer
</td>
</tr>
</table>

	linkages and lines of reasoning		and sustained line of reasoning.
	Answer has no linkages between points and is unstructured	0	
	Indicative content		
	IP1 magnesium has an extra shell than lithium (and as the charge on magnesium is Mg^{2+} and lithium Li^{+}) so the ions are similar in size.		Allow more shells/ more protons/ more periods/more shielding than lithium
	IP2 equation for the thermal decomposition of lithium **or** magnesium nitrate.		$4LiNO_3 \rightarrow 2Li_2O + 4NO_2 + O_2$ $2Mg(NO_3)_2 \rightarrow 2MgO + 4NO_2 + O_2$ If both equations are given both must be correct to score the IP
	IP3 equation for the thermal decomposition of sodium nitrate.		$NaNO_3 \rightarrow NaNO_2 + ½ O_2$ Allow fractions/ multiples in IP2 and IP3 Ignore state symbols even if incorrect in IP2 and IP3
	IP4 lithium and magnesium nitrate produce nitrogen dioxide but sodium nitrate does not/ or sodium nitrate produces a nitrite but lithium and magnesium do not		Can be scored by equations even if incorrect or unbalanced
	IP5 because Mg^{2+} and/or Li^{+} are smaller than Na^{+} Or Mg^{2+} and/or Li^{+} have greater charge density than Na^{+}		This may be seen in a general trend i.e. the ions in a group get larger down the group/charge density decreases down the group Allow Mg/Li is smaller than Na
	IP6 so polarise the **nitrate ion**/ **anion more** (causing Mg^{2+} and Li^{+} to thermally decompose in a similar manner) Must be a comparison.		Allow weakens the N-O bond (of the nitrate) **more**
	If there has been no mention of Na max 3 as only IP1, 2 and 5 can be awarded		Allow reverse argument for IP4, IP5 and 1P6