Mark Scheme (Results)

October 2023

Pearson Edexcel International Advanced Subsidiary Level In Chemisty (WCH12)
Paper 01 Unit 2: Energetics, Group Chemistry, Halogenoalkanes and Alcohols

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Section A

Question Number	Answer	Mark
1	**The only correct answer is C** ($CF_4(g) \rightarrow C(g) + 4F(g)$) ***A*** *is incorrect because this equation represents the bond formation of 4 CF bonds and is exothermic* ***B*** *is incorrect because this equation represents the enthalpy change of formation of* CF_4 *from its elements* ***D*** *is incorrect because this equation represents the enthalpy change of the reaction of* CF_4 *to its elements*	**(1)**

Question Number	Answer	Mark
2	**The only correct answer is A** (−554 − 394 + 1216) ***B*** *is incorrect because the sign of the enthalpy change of formation of the reactant is incorrect* ***C*** *is incorrect because the sign of the enthalpy change of formation of the products is incorrect* ***D*** *is incorrect because sign of the enthalpy change of formation of both the reactant and products is incorrect*	**(1)**

Question Number	Answer	Mark
3	**The only correct answer is D** (C_9H_{20}) ***A*** *is incorrect because the increment is ~630* $kJ\ mol^{-1}$ *so expected enthalpy change of combustion would be* $-4139\ kJ\ mol^{-1}$ ***B*** *is incorrect because the increment is ~630* $kJ\ mol^{-1}$ *so expected enthalpy change of combustion would be* $-4769\ kJ\ mol^{-1}$ ***C*** *is incorrect because the increment is ~630* $kJ\ mol^{-1}$ *so expected enthalpy change of combustion would be* $-5399\ kJ\ mol^{-1}$	**(1)**

Question Number	Answer	Mark
4	**The only correct answer is D** (H_2S, ✓,✓, X) **A** *is incorrect because boron trifluoride is not polar ~~, does not contain hydrogen~~ and has London forces* **B** *is incorrect because methane does not hydrogen bond* **C** *is incorrect because ammonia is polar and has hydrogen bonds*	**(1)**

Question Number	Answer	Mark
5	**The only correct answer is A** (butan-1-ol) **B** *is incorrect because the hydrocarbon section of the molecule is branched* **C** *is incorrect because the hydrocarbon section of the molecule is branched* **D** *is incorrect because pentane does not hydrogen bond*	**(1)**

Question Number	Answer	Mark
6	**The only correct answer is C** (4) ***A** is incorrect because neither the oxygen atoms nor the hydrogen atoms balance* ***B** is incorrect because neither the oxygen atoms nor the hydrogen atoms balance* ***D** is incorrect because neither the oxygen atoms nor the hydrogen atoms balance*	**(1)**

Question Number	Answer	Mark
7	**The only correct answer is D** ($S_2O_3^{2-} + 2H^+ \rightarrow SO_2 + S + H_2O$) ***A*** *is incorrect because copper is oxidised and nitrogen is reduced* ***B*** *is incorrect because iodine is oxidised and some of the oxygen in ozone is reduced* ***C*** *is incorrect because the reverse reaction is a disproportionation*	**(1)**

Question Number	Answer	Mark
8	**The only correct answer is C** (bromine, hydrogen bromide and sulfur dioxide only) ***A*** *is incorrect because hydrogen bromide is oxidised by concentrated sulfuric acid* ***B*** *is incorrect because the bromide ions reduce the sulfuric acid to sulfur dioxide* ***D*** *is incorrect because the bromide ions are not strong enough reducing agents to further reduce the sulfuric acid*	**(1)**

Question Number	Answer	Mark
9	**The only correct answer is C** (solubility of the sulfates) ***A*** *is incorrect because the atomic radius increases* ***B*** *is incorrect because the reactivity of the elements increases* ***D*** *is incorrect because the thermal stability of the nitrates increases*	**(1)**

Question Number	Answer	Mark
10	**The only correct answer is A** (0.33) ***B*** *is incorrect because the increase in volume due to added alkali has been ignored* ***C*** *is incorrect because the moles of reactant have been added together* ***D*** *is incorrect because the increase in volume due to the added acid has been ignored*	**(1)**

Question Number	Answer	Mark
11(a)	**The only correct answer is D** (rate decreases and yield increases) ***A*** *is incorrect because a decrease in temperature would decrease the rate but increase the yield* ***B*** *is incorrect because a decrease in temperature would decrease the rate* ***C*** *is incorrect because a decrease in temperature would increase the yield*	**(1)**
Question Number	**Answer**	**Mark**
11(b)	**The only correct answer is B** (rate increases and yield increases) ***A*** *is incorrect because an increase in pressure would increase the yield* ***C*** *is incorrect because an increase in pressure would increase the rate and increase the yield* ***D*** *is incorrect because an increase in pressure would increase the rate*	**(1)**

Question Number	Answer	Mark
12	**The only correct answer is C** (the mixture becomes more yellow) ***A*** *is incorrect because the position of equilibrium would change* ***B*** *is incorrect because coloured ions would still be present* ***D*** *is incorrect because the removal of the hydrogen ions would move the position of equilibrium to the left*	**(1)**

Question Number	Answer	Mark
13(a)	**The only correct answer is A** (1-methylcyclopentanol) ***B*** *is incorrect because 2-methylcyclopentanol is a secondary alcohol* ***C*** *is incorrect because 2-methylbutan-1-ol is a primary alcohol* ***D*** *is incorrect because 3-methylpentan-2-ol is a secondary alcohol*	**(1)**

Question Number	Answer	Mark
13(b)	**The only correct answer is C** (phosphorus(V) chloride) ***A*** *is incorrect because acidified aqueous potassium dichromate(VI) does not oxidise tertiary alcohols* ***B*** *is incorrect because bromine water does not react with alcohols* ***D*** *is incorrect because sodium carbonate solution does not react with alcohols*	**(1)**

Question Number	Answer	Mark
14(a)	**The only correct answer is D** (C═O stretching at 1720 − 1700 cm^{-1}) ***A*** *is incorrect because the alcohol will have been oxidised* ***B*** *is incorrect because an aldehyde is not an oxidation product of a secondary alcohol* ***C*** *is incorrect because the ketone cannot be further oxidised by acidified potassium dichromate(VI)*	**(1)**

Question Number	Answer	Mark
14(b)	**The only correct answer is B** (C═O stretching *at 1740 − 1720 cm*$^{-1}$) ***A*** *is incorrect because the aldehyde product will distil at a lower temperature than the reactant* ***C*** *is incorrect because the aldehyde is removed from the oxidising agent so cannot be further oxidised* ***D*** *is incorrect because a ketone is not formed when a primary alcohol is oxidised*	**(1)**

Question Number	Answer	Mark
15	**The only correct answer is B (**the C-Cl bond is stronger than the C-Br bond) **A** *is incorrect because the solubility of the halogenoalkane does not affect the rate* **C** *is incorrect because the polarity of the C-halogen bond does not affect the rate* **D** *is incorrect because the solubility of the silver salt does not affect the rate*	**(1)**

Question Number	Answer	Mark
16	**The only correct answer is C** (2.26) ***A*** *is incorrect because this is half the mass of the product* ***B*** *is incorrect because only one OH group is replaced by chlorine* ***C*** *is incorrect because this is double the mass of the product*	**(1)**

Question Number	Answer	Mark
17	**The only correct answer is B** (2-chloropropane) ***A*** *is incorrect because a primary amine would be formed* ***C*** *is incorrect because alkanes do not react with ammonia* ***D*** *is incorrect because alkenes do not react with ammonia*	**(1)**

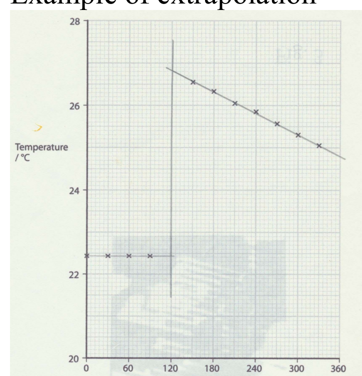
TOTAL FOR SECTION A = 20 MARKS

A	B	C	D
4	5	5	6

Section B

Question Number	Answer	Additional Guidance	Mark
18(a)(i)	An answer that makes reference to the following point: • balanced ionic equation	$H^+ + OH^- \rightarrow H_2O$ Accept $H_3O^+ + OH^- \rightarrow 2H_2O$ Accept multiples Ignore full equation as working Ignore state symbols even if incorrect Do not award uncancelled spectator ions	**(1)**

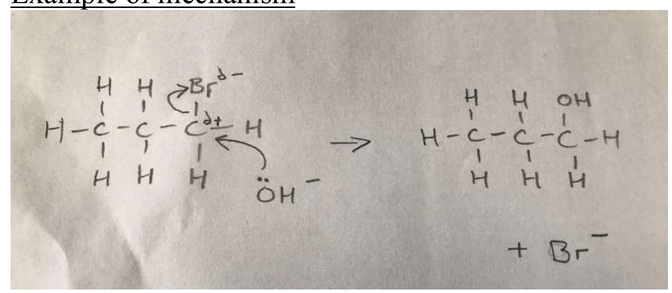
Question Number	Answer	Additional Guidance	Mark
18(a)(ii)	An answer that makes reference to the following points: • heat energy released under standard conditions **(1)** • (when) 1 mol of **water** is produced (by the reaction of acid with alkali) **(1)**	Allow enthalpy change under standard conditions Allow for standard conditions 1 atm / 1(.01) x10^5Pa and a stated temperature / 298K / 25°C Ignore standard states Do not award required	**(2)**

Question Number	Answer	Additional Guidance	Mark
18(b)(i)	An answer that makes reference to the following points: • two lines of best fit drawn **(1)** • value ±0.2 **(1)**	Cooling may be shown as straight line or smooth curve $\Delta T = 26.8 - 22.4 = 4.4^{O}C$ Accept value between 4.2 ^{O}C and 4.6 ^{O}C from a correct vertical extrapolation at 120s Example of extrapolation 	**(2)**

Question Number	Answer		Additional Guidance	Mark
18(b)(ii)	An answer that makes reference to the following points: • energy transferred to solutions • moles of water formed • enthalpy change of neutralisation with negative sign and units	 (1) (1) (1)	<u>Example of calculation:</u> $0.05 \times 4.2 \times 4.4 = 0.924$ (kJ) $50 \times 4.2 \times 4.4 = 924$ (J) $(25 \div 1000) \times 0.8 = 0.02$(mol) $0.924 \div 0.02 = -46.2$ kJ mol^{-1} /$-46{,}200$ J mol^{-1} T E on b(i) and throughout b(ii) Ignore SF except 1 SF Comment: Range based on range on graph -44.10 kJ mol^{-1} to -48.30 kJ mol^{-1}.	**(3)**

Question Number	Answer		Additional Guidance	Mark
18(b)(iii)	An explanation that makes reference to the following points: • (because the calculation has not taken into account the) energy required to heat the calorimeter/ the (total) heat capacity would be greater • the value(of the enthalpy change of neutralisation) would be more exothermic/more negative	 (1) (1)	Ignore references to the relative heat capacity of copper/water(solution) Allow higher/ increase/ greater	**(2)**

Question Number	Answer	Additional Guidance	Mark
18(c)(i)	An answer that makes reference to the following points: nucleophilic **and** substitution	 Allow nucleophile Ignore S_N2 Do not award S_N1, halogenation, nuclear	**(1)**

Question Number	Answer	Additional Guidance	Mark
18(c)(ii)	An answer that makes reference to the following points: • dipole on C-Br bond • lone pair on O of OH^- • curly arrow from lone pair to **C of C-Br**. If no lone pair shown, allow curly arrow from O • arrow from C-Br to Br or just beyond • organic product • Br^-	<u>Example of mechanism</u>  Allow product as structural formula rather than displayed Allow NaBr Ignore Na^+ Do not award HBr 6 points correct scores (3) 4 /5 points correct scores (2) 2 / 3 points correct scores (1) Ignore intermediate/ transition state if shown	**(3)**

Question Number	Answer	Additional Guidance	Mark
18(c)(iii)	An answer that makes reference to the following points: • elimination **(1)** • ethanol / alcohol **(1)**	 Do not award addition/substitution/dehydration/acid/base Allow ethanolic /alcoholic solution Do not award acid	**(2)**

(Total for Question 18 = 16 marks)

Question Number	Answer	Additional Guidance	Mark
19(a)(i)	An answer that makes reference to the following point: • yellow	Allow pale yellow Comment Do not award white,cream	**(1)**

Question Number	Answer	Additional Guidance	Mark
19(a)(ii)	• moles of silver iodide **(1)** • mass of potassium iodide in mixture **(1)** • % of potassium iodide in mixture **(1)**	<u>Example of calculation</u> $0.162 \div (107.9 + 126.9) = 6.8995 \times 10^{-4}$ / 0.00068995 (mol) $6.8995 \times 10^{-4} \times (39.1+126.9) = 0.11453$ (g) $(0.11453 \div 2.49) \times 100 = 4.5997$ = 4.6 / 4.60 (%) Answer to 2 or 3 SF Allow TE on transcription errors unless final answer is >100% Do not award 4.5% for M3 $(0.162 \div 2.49) \times 100 = 6.51\%$ scores 0 Comment: If no other mark scored allow one mark for correct calculation of Mr AgI (234.8) **and** Mr KI (166) If they think the ppt is AgCl Moles AgCl = $0.162 \div (107.9 + 35.5) = 1.13 \times 10^{-3}$ / 0.00113 (mol) Mass KCl = $0.00113 \times (39.1 + 35.5) = 0.0843$ g % KI = $\frac{2.49 - 0.0843}{2.49} \times 100 = 96.6\%$ Scores 2	**(3)**

Question Number	Answer	Additional Guidance	Mark
19(b)	An answer that makes reference to the following points: • manganese **reduced** from (+) 4 to (+) 2 **(1)** • chlorine is **oxidised** from −1 to 0 **(1)**	Oxidation numbers may be shown on equation Allow chloride for chlorine If no other mark awarded: Allow 1 mark for manganese reduced and chlorine oxidised OR Oxidation states of Mn and Cl: all four correct scores 1 Any other incorrect oxidation numbers loses 1 mark Comment: allow 4+ to 2+ for Mn; 1- to 0 for Cl Ignore references to loss/gain of electrons even if incorrect	**(2)**

Question Number	Answer	Additional Guidance	Mark
19(c)	An answer that makes reference to the following points: • aqueous layer is yellow **(1)** • hexane layer is purple/pink/violet **(1)**	Allow orange / brown /straw / colourless Do not award red/red-brown/yellow-green Allow lilac If colours are reversed allow one mark.	**(2)**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr>
<td>*19(d)</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><td>Number of indicative marking points seen in answer</td><td>Number of marks awarded for indicative marking points</td></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><td></td><td>Number of marks awarded for structure of answer and sustained lines of reasoning</td></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 linkages and lines of reasoning</td><td>1</td></tr>
<tr><td>Answer has no linkages between points and is unstructured</td><td>0</td></tr>
</table>
</td>
<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
3 or 4 indicative points would get 1 reasoning mark
0, 1 or 2 indicative points would get zero reasoning marks
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 and sustained line of reasoning
</td>
<td>(6)</td>
</tr>
</table>

	Indicative content **IP1 iodine has (only) London forces/cannot form hydrogen bonds** **IP2 water molecules form hydrogen bonds (and London forces and permanent dipoles)** **IP3 hydrogen bonds are stronger than London forces/ the strongest (intermolecular force)** **IP4 hexane forms (only) London forces/cannot form hydrogen bonds** **IP5 London forces formed between iodine and hexane are similar (in strength) to those (broken) in hexane/ iodine (so iodine dissolves)** **IP6 Iodine cannot form hydrogen bonds/ only forms weak London forces with water so the (hydrogen) bonds between water molecules cannot be broken (so iodine does not dissolve in water)** Any reference to both hexane and iodine having permanent dipole interactions penalise in 1 IP only. Hexane has fewer electrons than iodine so any statement that hexane has more/stronger London forces than iodine is incorrect so loses 1 reasoning mark.	Accept instantaneous/induced dipole /IDID/dispersion forces for London forces Allow van der Waals' forces for London forces Allow:London forces between iodine and hexane are greater than those between hexane Comment: IP1,2 and 4 are awarded for correct statements about the imf in pure substances IP3 is awarded for a correct statement about the relative strength of H-bonds and London forces IP5 is awarded for a recognition that the bonds formed between iodine and hexane are similar/ London forces IP6 is awarded for a recognition that the H-bonds in water cannot be broken because London forces (between Iodine and water) are not strong enough/do not release enough energy	

(Total for Question 19 = 15 marks)

Question Number	Answer	Additional Guidance	Mark
20(a)(i)	An answer that makes reference to the following points: • equation **(1)** • state symbols **(1)**	$CO_3^{2-}(s/aq) + 2H^+(aq) \rightarrow CO_2(g) + H_2O(l)$ $CO_3^{2-}(s/aq) + 2H_3O^+(aq) \rightarrow CO_2(g) + 3H_2O(l)$ M2 depends on M1 or near miss e.g. full equation or uncancelled spectator ions Do not award $H_2O(g)$	**(2)**

Question Number	Answer	Additional Guidance	Mark
20(a)(ii)	• the mixture/solution would go cloudy/milky/ a white precipitate would form **(1)**	Ignore $CaCO_3$ formed Do not award effervescence/fizzing/misty	**(1)**

Question Number	Answer		Additional Guidance	Mark
20(b)(i)			<u>Example of calculation:</u>	**(4)**
	• calculate mols hydrochloric acid in titre	**(1)**	$18.95 \times 0.0500 \times 10^{-3} = 9.475 \times 10^{-4}$ (mols)	
	• calculate mols calcium hydroxide in 25.0 cm^3	**(1)**	$9.475 \times 10^{-4} \div 2 = 4.7375 \times 10^{-4}$ (mols)	
	• calculate mass calcium hydroxide in 25.0 cm^3	**(1)**	$4.7375 \times 10^{-4} \times (40.1+34) = 3.51049 \times 10^{-2}$ (g)	
	• calculate mass calcium hydroxide in 1.00 dm^3	**(1)**	$3.51049 \times 10^{-2} \times 1000 \div 25 = 1.4042$ (g dm^{-3}) Ignore SF except 1 SF	
	• moles calcium hydroxide in 1 dm^3		Alternative method for M3/M4	
	• mass calcium hydroxide in 1 dm^3	**(1)**	$4.7375 \times 10^{-4} \times 1000 \div 25 = 0.01895/ 1.895 \times 10^{-2}$	
		(1)	$1.895 \times 10^{-2} \times (40.1+34) = 1.4042$ (g dm^{-3})	
			Use of 40.0 for A_r Ca could score full marks Final answer 1.4023 (g dm^{-3})	

Question Number	Answer		Additional Guidance	Mark
20(b)(ii)	An answer that makes reference to the following points:			**(2)**
	• strontium hydroxide is more soluble than calcium hydroxide	**(1)**	Accept:because solubility of the hydroxides increases down the group	
	• (so) titre value would be greater(than that for calcium) or reverse	**(1)**	M2 must be consistent with M1. ALLOW one mark for strontium hydroxide is less soluble so titre value would be smaller	

Question Number	Answer	Additional Guidance	Mark
20(c)	An explanation that makes reference to three of the following points • the concentration of carbonic acid /H_2CO_3 will increase **(1)** • the equilibrium position will move to the RHS **(1)** • (the hydrogen ion concentration will increase so) the acidity will increase **(1)**	Do not award M3 if M2 is incorrect. Comment: If no indication of change in equilibrium position then M3 can be awarded.	**(3)**

(Total for Question 20 = 12 marks)
TOTAL FOR SECTION B = 42 MARKS

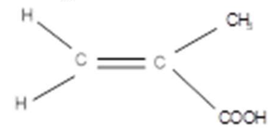
Section C

Question Number	Answer	Additional Guidance	Mark
21(a)(i)	An answer that makes reference to the following points: • calculate mass oxygen in compound **X** **(1)** • calculate moles carbon,hydrogen and oxygen **(1)** • mole ratio **and** empirical formula **(1)**	<u>Example of calculation:</u> 1.92 – (1.08 + 0.131) = 0.709 (g) 1.08 ÷ 12 = 0.0900 (mols) carbon 0.131(mols) hydrogen 0.709 ÷ 16 = 0.044313 (mols) oxygen 0.09 : 0.131 : 0.043688 2.03 ; 2.96 : 1 C_2H_3O If only two elements considered award M3 if correct (C_2H_3)	**(3)**

Question Number	Answer	Additional Guidance	Mark
21(a)(ii)	An answer that makes reference to the following points: • $C_4H_6O_2$ **(1)** • empirical formula mass x 2 = mass of molecular ion **(1)**	Evidence of M_r = 86 scores M2	**(2)**

Question Number	Answer	Additional Guidance	Mark
21(a)(iii)	An answer that makes reference to the following points: • C=C/alkene/carbon-carbon double bond **(1)** • -COOH/carboxylic acid/carboxyl **(1)**	Do not award carbonyl	**(2)**

Question Number	Answer	Additional Guidance	Mark
21(a)(iv)	An answer that makes reference to the following points: • peak at 41 $C_3H_5{+}$ **(1)** • peak at 45 COOH+ **(1)**	Allow any acceptable structure with $C_3H_5{+}$ Allow $CO_2H{+}$ Do not award $CHO_2{+}$ Positive charge can be anywhere on ion Penalise omission of positive charge and/or presence of negative charge once only	**(2)**

Question Number	Answer	Additional Guidance	Mark
21(a)(v)	An answer that makes reference to the following point:	Accept  The arrangement around the double bond must be displayed. Skeletal formula is acceptable.	**(1)**

Question Number	Answer		Additional Guidance	Mark
21(b)(i)	An explanation that makes reference to the following points:			**(3)**
	• provides an alternative pathway/route with a lower activation energy	**(1)**	Allow E_a^{cat} at a lower energy shown on diagram	
	• so a greater proportion of molecules have $E > E_a$/area under the curve to the right of E_a increases	**(1)**	M2 can be shown on diagram	
	• so a higher proportion of collisions are successful	**(1)**	Allow higher frequency of successful collisions	

Question Number	Answer	Additional Guidance	Mark
21(b)(ii)	An answer that makes reference to the following point: • CH_2=CH-CHO + [O] → CH_2=CHCOOH	Accept correct displayed/skeletal/structural formulae provided aldehyde and carboxyl groups are clear. Do not award molecular formulae Do not award -COH in propenal; Do not award $CHOCH_2CH$ in propenal Do not award CHO_2in carboxylic acid	**(1)**

Question Number	Answer	Additional Guidance	Mark
21(c)(i)	An answer that makes reference to the following points: • potassium manganate(VII)/potassium permanganate **(1)** • acidified/cold/room temperature/dilute aqueous solution **(1)**	M2 depends on M1 or near miss Do not award: heat(under reflux) Comment :accept Osmium tetroxide/ OsO_4 Comment: allow alkaline	**(2)**

Question Number	Answer	Additional Guidance	Mark
21(c)(ii)	An explanation that makes reference to two of the following points: • from propene the starting material is crude oil which is non-renewable/finite **(1)** • from propane-1,2,3-triol, the starting material is from biomass/uses a by-product/reduces waste from bioiesel production **(1)** • propane-1,2,3-triol route produces only water as unwanted product **(1)** • from propene manganese compounds need to be separated **(1)**	Allow glycerol for propane-1,2,3-triol Ignore references to greenhouse gases or global warming Ignore references to fermentation	**(2)**

(Total for Question 21 = 18 marks)

TOTAL FOR SECTION C = 18 MARKS

TOTAL FOR PAPER = 80 MARKS

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