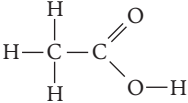
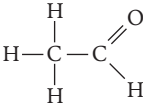
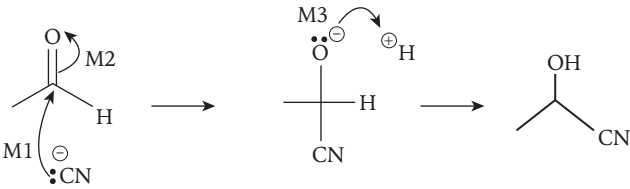


Question	Answers	Extra information	Mark	AO Spec reference
01.1	Acidified potassium dichromate(VI) AND reflux OR $K_2Cr_2O_7/H_2SO_4$ AND reflux	Must state acidified, or have acid as reagent. Reject dichromate alone as this is an ion not a reagent	1	3.3.5.2,
01.2	Pentanoic acid		1	3.3.1.1,
01.3			1	3.3.9.1,
01.4	M_r pentan-1-ol = 88 ($g\ mol^{-1}$) Moles pentan-1-ol = $0.151\ g / 88\ g\ mol^{-1} = 0.00172\ (mol)$ Ratio alcohol : ester = 1:1 Theoretical moles ester = 0.00172 (mol) M_r ester = 130 ($g\ mol^{-1}$) Theoretical mass ester = $0.00172 \times 130 = 0.2236\ g$ % yield = actual/theoretical = $0.161\ g / 0.2236\ g \times 100 = 72\%$		1 1 1 1	3.1.2.5, MS 0.0, MS 0.0, MS 0.2, MS 1.1, MS 2.3
02.1		Must show double bond to carbon and single bond to hydrogen.	1	3.3.1.1
02.2			3	3.3.8

A Level AQA Chemistry

Chapter 20 – answers

Question	Answers	Extra information	Mark	AO Spec reference
02.3	Add Tollens reagent, and warm gently for a few minutes Ketone: no change in the colourless solution Aldehyde: colourless solution produces a grey precipitate of silver/silver mirror is produced on the test tube.		1 1 1	3.3.8
03.1	It is a renewable fuel	Allow other valid points	1	3.3.9.1
03.2	$\begin{array}{c} \text{H} \quad \quad \text{O} \\ \quad \quad \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{R}_1 \\ \quad \quad \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{R}_2 \\ \quad \quad \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{R}_3 \\ \\ \text{H} \end{array}$	Only one of the three ester bonds shown needs to be circled.	1	3.3.9.1
03.3	Dilute acid, heat	Need both reagent and condition for mark	1	3.3.9.1
03.4	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{O} \quad \text{O} \quad \text{O} \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	Need to show all bonds for the mark.	1	3.3.9.1
03.5	A straight-chain molecule will have a higher boiling point increased van der Waals forces between molecules meaning more energy is needed to overcome intermolecular forces/attractions		1 1 1	3.1.3.7

Question	Answers	Extra information	Mark	AO Spec reference
04.1	<p>OR</p> <p>Compound D</p>	Mark for structure of D can be given in the mechanism.	4	3.3.8 3.3.1.1
04.2	3,3-dimethylbutan-1-ol		1	3.3.1.1
04.3	5		1	3.3.15
04.4	Tollens reagent, and warm gently for a few minutes Ketone: no change in the colourless solution Aldehyde: colourless solution produces a grey precipitate of silver/silver mirror is produced on the test tube.		1 1 1	3.3.8
05.1	SOCl ₂	Allow PCl ₃ or PCl ₅	1	3.3.9.2
05.2			4	3.3.9.2
05.3	Nucleophilic addition-elimination		1	3.3.9.2

Question	Answers	Extra information	Mark	AO Spec reference
05.4	M_r Compound F = 78.5 (g mol ⁻¹) Moles compound F = 1.727 g / 78.5 g mol ⁻¹ = 0.022 mol Ratio compound F : ester = 1 : 1 Moles ester G = 0.022 mol M_r ester G = 88 (g mol ⁻¹) Theoretical mass ester G = 1.936 g Percentage yield = 1.540 / 1.936 × 100 = 80%	Allow 79.5%	1	3.1.2.5, MS 0.0, MS 0.1, MS 0.2, MS 1.1, MS 2.3,
			1	
			1	
			1	
06.1	Add deionised water to product, aspirin will precipitate Filter off precipitate Wash residue with deionised water Leave to dry		1	3.3.9.2
			1	
			1	
			1	
06.2	M_r of aspirin = 180 g mol ⁻¹ M_r ethanoic acid = 60 g mol ⁻¹ Total mass = 180 + 60 = 240 180/240 = 0.75 OR 75%		1	3.1.2.5, MS 0.0, MS 0.1, MS 0.2, MS 1.1, MS 2.3,
			1	
06.3	One of: Less corrosive Doesn't produce corrosive fumes of hydrogen chloride		1	3.3.9.2

Skills box answers:

- To ensure the sodium carbonate (solution) is mixed thoroughly with the organic phase.
 - To release the pressure from the build-up of CO₂ / to release CO₂.
- To remove water (when the liquid is clear there are no droplets of water in the solution).
 - To remove the calcium chloride.