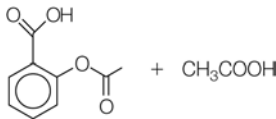
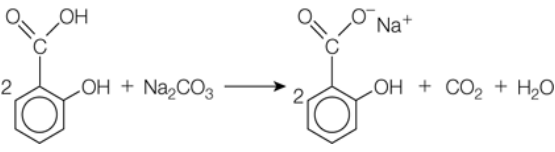
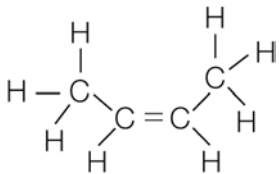
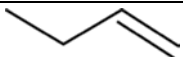


Question number	Answer	Marks	Guidance
1	D	B1	HCOOC ₃ H ₇ has two isomers, one with branching in the chain
2	B	B1	
3	C	B1	distillation produces mostly aldehyde
4	D	B1	all other sequences will involve solutions of impurities evaporating on the crystals
5	A	B1	
6	A	B1	The M+1 peak is caused by the presence of C ¹³
7	C	B1	
8	B	B1	
9	D	B1	
10	A	B1	
11 (a)	 <p>1 mark for diagram</p> <p>1 mark for CH₃COOH</p>	<p>B1</p> <p>B1</p>	any unambiguous structures for each compound
11 (b) (i)	Recrystallisation	B1	
11 (b) (ii)	Higher than before	B1	
11 (b) (iii)	<p>$n(\text{salicylic}) = 10/138$ $(= 0.0725 \text{ mol})$ max. mass aspirin = $10 \times 181/138$ (= 13.12 g) $\% = (5 \times 100/13.12) = 38\%$</p>	<p>B1</p> <p>B1</p>	<p>Alternative method</p> <p>max amount aspirin = 0.0725 mol</p> <p>amount formed = $5/181$ $(= 0.0276 \text{ mol})$ $\% = (0.0276 \times 100/0.0725) = 38\%$</p>

11 (b) (iv)	<p>Level 3 (5–6 marks) Candidate answers the question fully with all key points and three fine detail points</p> <p><i>The ideas are well structured providing significant clarity in the communication of the science</i></p> <p>Level 2 (3–4 marks) Candidate answers the question but without full detail by including all key points and at least one fine detail point.</p> <p><i>There is partial structuring of the ideas with the communication of the science generally clear</i></p> <p>Level 1 (1–2 marks) Candidate makes a reasonable attempt at the answer by giving 3 key points or 2 key points and 1 fine detail point.</p> <p><i>The ideas expressed are poorly structured and do not contribute to the communication of the science</i></p> <p>Level 0 (0 marks) No response or no response worthy of credit.</p>	B1 × 6	<p>Key points</p> <ul style="list-style-type: none"> • beaker with solvent and TLC plate • spots of their sample and salicylic acid and aspirin on plate • run chromatogram • examine spots at the same level to see what is present in their sample <p>Fine detail</p> <ul style="list-style-type: none"> • solvent starts below spots • sample, salicylic acid and aspirin all in solution (in ethanol) • cover beaker for run • use uv or iodine to locate spots <p><i>Points made be made in a diagram where appropriate</i></p>
11 (c) (i)	<p>salicylic acid (only)</p> <p>phenol</p> <p>purple colour</p>	<p>B1</p> <p>B1</p> <p>B1</p>	
11 (c) (ii)	 <p>one mark for salt</p> <p>one mark for completely correct</p>	<p>B1</p> <p>B1</p>	<p>ALLOW –ONa in salt but not –O–Na</p>
11 (d) (i)	<p>$n(\text{NaOH}) = 24.7 \times 0.1/1000 (= 2.47 \times 10^{-3})$</p> <p>$n(\text{aspirin}) = 2.47 \times 10^{-3} \times 180 (= 0.445 \text{ g})$</p> <p>$\% = 0.445 \times 100/1.05 = 42.3\%$</p>	<p>B1</p> <p>B1</p>	<p>ALLOW ecf</p>
11 (d) (ii)	both –OH and –COOH	B1	ALLOW formula for salt for both

	form salts	B1	marks.
11 (d) (iii)	salicylic acid (or any named acid)	B1	
12 (a) (i)	Secondary C bearing OH is attached to two Cs OR has one H attached	B1 B1	
12 (b) (i)	acid dichromate heat or reflux	B1 B1	Allow correct names or formulae First mark must be scored to score second
12 (b) (ii)	CH ₃ COC ₂ H ₅ Ketone	B1 B1	
12 (c)	partial conversion both –OH and –C=O present O-H absorption around 3400 C=O absorption around 1700	B1 B1 B1 B1	
12 (d) (i)	74: M ⁺ 75 (very small): M+1	B1 B2	
12 (d) (ii)	M ⁺ ion fragments into other ions.	B1	
12 (e)		B1	Angles are unimportant
12 (f) (i)	pass vapour at 300 C (±50) over alumina OR conc sulfuric acid Reflux	B1 B1 A1 A1	ALLOW correct formulae
12 (f) (ii)		B1	

