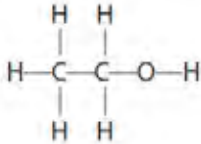
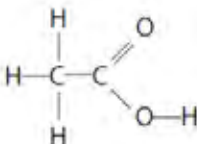


Question number	Answer	Mark
1(a)	An explanation that combines identification – improvement of the experimental procedure (1 mark) and justification/reasoning which must be linked to the improvement (1 mark): <ul style="list-style-type: none">• reverse the boiling tubes/pass gas through the tube in ice water first (1)• so that if any liquid condenses in the tube it must have come from the burning wax (and not from the limewater) (1)	(2)

Question number	Indicative content	Mark
*1(b)	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p>Candidates choose appropriate monomers to illustrate the formation of different polymers.</p> <ul style="list-style-type: none"> polymer molecules are long chains made up of simple repeating units use chloroethene (only) to form poly(chloroethene) which is addition polymerisation use ethane-1,2-diol and ethanedioic acid to form a polyester which is condensation polymerisation one of the bonds in the double bond in chloroethene molecule breaks and chloroethene molecules join together to form a long chain molecule equation $n \begin{array}{c} \text{H} & & \text{Cl} \\ & \diagdown & / \\ & \text{C} = \text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array} \longrightarrow \left[\begin{array}{cc} \text{H} & \text{Cl} \\ & \\ -\text{C} & - & \text{C}- \\ & \\ \text{H} & \text{H} \end{array} \right]_n$ <ul style="list-style-type: none"> identification of repeat unit alcohol group combines with a carboxylic acid group and an ester (link) formed with a water (molecule) eliminated equation $\begin{array}{c} \text{O} & & \text{O} \\ // & & // \\ \text{HO}-\text{C} & - & \text{C}-\text{OH} \\ & & \\ \text{H} & & \text{H} \end{array} + \begin{array}{c} \text{H} & \text{H} \\ & \\ \text{HO}-\text{C} & - & \text{C}-\text{OH} \\ & \\ \text{H} & \text{H} \end{array} \longrightarrow \begin{array}{c} \text{O} & \text{O} & & \text{H} & \text{H} \\ // & // & & & \\ -\text{C} & - & \text{C}-\text{O} & - & \text{C} & - & \text{C}-\text{O}- \\ & & & & \\ \text{H} & & & \text{H} & \text{H} \end{array} + \text{H}_2\text{O}$ <ul style="list-style-type: none"> ester link shown identification of repeat unit 	(6)

Level	Mark	Descriptor
	0	No awardable content.
Level 1	1–2	<ul style="list-style-type: none"> The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2) Lines of reasoning are unsupported or unclear. (AO2)
Level 2	3–4	<ul style="list-style-type: none"> The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2) Lines of reasoning mostly supported through the application of relevant evidence. (AO2)
Level 3	5–6	<ul style="list-style-type: none"> The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2) Lines of reasoning are supported by sustained application of relevant evidence. (AO2)

Question number	Answer	Marks
1(c)(i)	carboxylic acids	(1)

Question number	Answer	Marks
1(c)(ii)	<p>A is</p>  <p>(1)</p> <p>B is</p>  <p>(1)</p>	(2)