

# Aldehydes and Ketones

## Mark Scheme 1

Level	International A Level
Subject	Chemistry
Exam Board	Edexcel
Topic	Rates, Equilibria & Further Organic Chemistry
Sub Topic	Aldehydes and Ketones
Booklet	Mark Scheme 1

**Time Allowed:** 32 minutes

**Score:** /26

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

Question Number	Correct Answer	Reject	Mark
<b>1a</b>	C		1

Question Number	Correct Answer	Reject	Mark
<b>1b</b>	C		1

Question Number	Correct Answer	Reject	Mark
<b>1c</b>	D		1

Question Number	Correct Answer	Reject	Mark
<b>2</b>	D		1

Question Number	Correct Answer	Reject	Mark
<b>3</b>	A		1

Question Number	Correct Answer	Reject	Mark
<b>4</b>	<b>A</b>		<b>(1)</b>

Question Number	Correct Answer	Reject	Mark
<b>5</b>	<b>D</b>		<b>(1)</b>

Question Number	Correct Answer	Reject	Mark
<b>6</b>	<b>D</b>		<b>(1)</b>

Question Number	Correct Answer	Reject	Mark
<b>7</b>	<b>B</b>		<b>(1)</b>

Question Number	Correct Answer	Reject	Mark
<b>8</b>	<b>D</b>		<b>(1)</b>

Question Number	Correct Answer	Reject	Mark
<b>9</b>	B		<b>1</b>

Question Number	Correct Answer	Reject	Mark
<b>10</b>	D		<b>1</b>

Question Number	Acceptable Answers	Reject	Mark
<b>11(a)(i)</b>	(fractional) distillation / steam distillation / solvent extraction  <b>Ignore</b> filtration /use of separating funnel	recrystallisation	<b>1</b>

Question Number	Acceptable Answers	Mark
<b>11(a)(ii)</b>	$3\text{C}_{15}\text{H}_{31}\text{COOCH}_3 + \begin{array}{c} \text{CH}_2\text{OH} \\   \\ \text{CHOH} \\   \\ \text{CH}_2\text{OH} \end{array}$ 3 C <sub>15</sub> H <sub>31</sub> COOCH <sub>3</sub> <b>Allow</b> 3 CH <sub>3</sub> OOCC <sub>15</sub> H <sub>31</sub> <b>Allow</b> the correct formulae written three times <b>(1)</b>  Correct formula for propane-1,2,3-triol <b>(1)</b>  Mark independently	<b>2</b>

Question Number	Acceptable Answers	Mark
<b>11(a)(iii)</b>	Sodium hydroxide / potassium hydroxide / NaOH / KOH / OH <sup>-</sup>  <b>Allow</b> sulfuric acid / H <sub>2</sub> SO <sub>4</sub> or other named strong acids or strong alkalis /HCl / just 'acid' / just 'base' / just 'alkali' / just H <sup>+</sup>  <b>Ignore</b> concentrations of reagents, incorrect or missing state symbols	<b>1</b>

Question Number	Acceptable Answers	Mark
11(b)	<p><b>Do not award any marks for processing the plants or seeds into bio-diesel as the question is about growing</b></p> <p><b>Award (1) mark for any statement in the following headings:</b></p> <p>GREEN e.g. samphire / non-edible seeds / both are renewable / (produce bio-diesel that is) carbon neutral Ignore just "green / sustainable"</p> <p>LAND e.g. samphire uses land unlikely to be used for growing other food crops / no need to cut down trees to provide land / non-edible seed take up land otherwise used to grow crops</p> <p>WASTE e.g. non-edible seeds have no other use / would be thrown away / can only be used for oil production</p> <p>FOOD e.g. using samphire for bio-diesel <b>reduces availability</b> as a food source</p> <p>FOOD CHAIN e.g. using samphire disrupts the food chain for (marine) organisms</p> <p>GROWING e.g. samphire doesn't need to be irrigated / can take water or nutrients from the marshland Ignore just 'easier to grow' Ignore does not need specific conditions</p> <p>WEATHER e.g. samphire growing is subject to coastal weather</p> <p>TECHNOLOGY e.g. using samphire needs new / improved technology OR machines to farm coastal areas OR higher transport costs (from marshland to production plant) Ignore technology for processing plants or seeds</p> <p>WILL IT WORK? e.g. samphire gives unknown yield / use may need more research</p> <p><b>To score the maximum of 4 marks, the response must include a decision about which is greener but there is no separate mark for this.</b></p>	4

**Total for Question 11 = 8 marks**

Question Number	Acceptable Answers	Reject	Mark
<b>12(a)</b>	ethyl dodecanoate  <b>Allow</b> ethyldodecanoate ethyl dodecan-1-oate	ethyl decanoate / ethyl dodecanal/ ethyl dodecate / ethanoyl dodecanoate	<b>1</b>

Question Number	Acceptable Answers	Mark
<b>12(b)</b>	Reducing (agent)  <b>Allow</b> (source of) nucleophile  <b>Ignore</b> source of hydride ions	<b>1</b>

Question Number	Acceptable Answers	Mark
<b>12(c)</b>	Prevent further reduction / reduction of the aldehyde (to an alcohol)  <b>Allow</b> to prevent further reaction of dodecanal /aldehyde  <b>Ignore</b> reference to rates  <b>Ignore</b> higher yield/ prevent side reactions  <b>Ignore</b> exothermic / optimum temperature  <b>Ignore</b> volatility	<b>1</b>

Question Number	Acceptable Answers	Mark
<b>12(d)</b>	<p><b>If final answer is 3.74 (g), with or without working, award 3 marks</b></p> <p>Moles ester = <math>5.26 / 228 = 0.02307</math> mol  <b>NOTE:</b> Do not allow this rounded to 0.02 <b>(1)</b></p> <p><b>EITHER</b></p> <p>So mass of aldehyde at 100%  <math>= 0.02307 \times 184</math>  <math>= 4.2449</math> (g) <b>(1)</b></p> <p>But yield is 88%, so actual mass  <math>= 4.245 \times 0.88</math>  <math>= 3.7355 / 3.74</math> (g)                      Allow 3.73 g if 4.24 g of aldehyde used <b>(1)</b></p> <p><b>OR</b></p> <p>But yield is 88%, so actual moles  <math>= 0.02307 \times 0.88</math>  <math>= 0.02(03)</math> <b>(1)</b></p> <p>So mass of aldehyde formed  <math>= 0.0203 \times 184</math>  <math>= 3.7355 / 3.74 / 3.7</math> (g) <b>(1)</b></p> <p><b>Allow</b> TE for 2<sup>nd</sup> and 3<sup>rd</sup> marks</p> <p>Ignore SF in final answer except 1SF</p>	<b>3</b>

**Total for Question 12 = 6 marks**