

Question 8a i

C₅H₁₂

Students should be aware that they should not provide 'working out' material in the response boxes provided as this can invalidate a correct response.

Question 8a.ii.

The type of reaction is a substitution reaction.

Question 8b.

Any valid semi-structural representation of pentan-1-ol. Typical examples of acceptable forms are:

CH₃CH₂CH₂CH₂CH₂OH or CH₃(CH₂)₄OH or CH₃(CH₂)₃CH₂OH

Students should be aware that a representation such as 'OHCH₂CH₂CH₂CH₂CH₃' is an incorrect representation of a terminal hydroxyl group.

Question 8c.

Either propan-1-ol or 1-propanol were acceptable responses. Both of these follow IUPAC nomenclature conventions.

Question 8d.i.

Any of the following qualitative tests were accepted for the first mark.

The second mark was associated with the correct observation applicable to the test chosen.

Test	Observation
pH test using a pH meter	pH would be shown as less than 7
pH testing using an indicator / pH paper*	Correct colour observation stated
Adding any metal carbonate (carbonate test)	Bubbles forming
Adding an alcohol and sulfuric acid (esterification)	Distinct smell being formed**
Adding a group 2 metal***	Bubbles forming
IR spectroscopy	Both the O-H bond at 2500–3500 cm ⁻¹ and the C=O at around 1800 cm ⁻¹

* The indicator must be able to undergo a distinct colour change at a pH less than 7.

** Normally the smell is described as 'sweet' or 'fruity', but any 'smell' was accepted as a significant number of students would have manufactured biodiesel as part of their laboratory work and biodiesels do not have this type of 'fruity' smell.

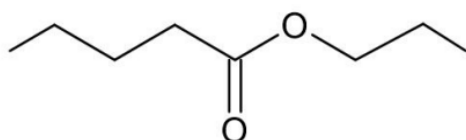
**** Group 1 metals were not accepted as these produce gas if any labile hydrogen is present, and therefore cannot be used to identify the compound specifically as a carboxylic acid.*

Incorrect responses such as 'limewater test' could not be awarded marks as this tests the product of the reaction between a carboxylic acid and a metal carbonate, not the carboxylic acid itself. The addition of an acid to limewater produces a salt and water, which cannot be observed.

In order to gain these marks for the limewater test, the student needed to indicate that the unknown organic compound had to be reacted with a metal carbonate first, and the gas produced then tested using the limewater test to confirm the presence of carbon dioxide being evolved.

Question 8d.ii.

A clear skeletal diagram was required as represented below.



The only significant issue that arose from this question related to the fact that some students did not use the box provided on page 14 (as specified in the question) and instead provided their response in the blank space at the bottom of page 15. Students are reminded to provide responses in the correct location on the examination.