Section A

1. What is the functional group of the carboxylic acids?
   Tick (✓) **one** box.

   A. -COOH ☐

   B. -COH ☐

   C. -C=O ☐

2. Choose the chemical formula of methanoic acid?

   Tick (✓) **one** box.

   A. CH_3COOH ☐

   B. HCOOH ☐

   C. COOH ☐

3. Complete the structural formula for propanoic acid:

   C C C

4. Complete these word equations for reactions of carboxylic acids:

   a. _____ acid + calcium → calcium methanoate + _____

   b. Propanoic acid + _____ oxide → sodium propanoate + _____

   c. Butanoic acid + potassium carbonate → potassium butanoate + _____ + _____

Section B

5. The table below gives some information about carboxylic acids.

Name	**Chemical formula**	**pH (of 0.01 mol/dm^3) solution**
Methanoic acid		2.9
Ethanoic acid	CH_3COOH	3.4
	C_2H_5COOH	3.5

a. Complete the table above.

A student adds zinc carbonate powder to a solution of ethanoic acid in an open conical flask, placed on a mass balance.

b. Explain what would happen to the mass of the flask and contents during the reaction.

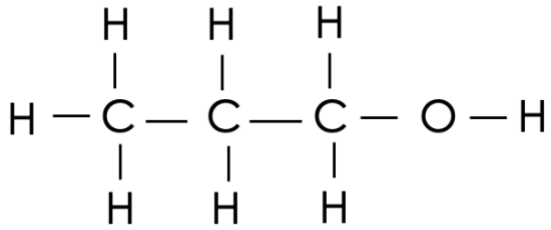
c. Explain how this would be different if the student had added zinc oxide powder instead of zinc carbonate.

d. Calculate the relative formula mass of ethanoic acid.

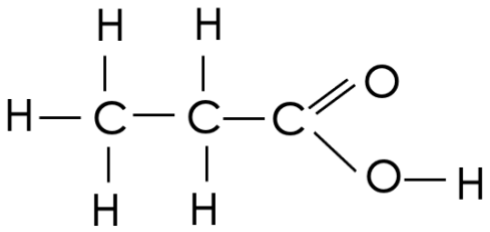
e. Calculate the percentage by mass of carbon in ethanoic acid.

6. The diagrams below show the structural (displayed) formulae of two organic compounds.

Compound A



Compound B



a. Explain what is meant by an organic compound.

b. Name compounds A and B.

c. Both compounds are colourless liquids. Describe a simple chemical test that could be done in a test tube to determine which compound is which.

Section C

7. (HT) Carboxylic acids are weak acids.
   a. Define a weak acid.
   b. Give an example of a strong acid.
   c. Compare the pH of a weak and strong acid with the same concentration.
   d. Compare the pH of a dilute and concentrated sample of the same acid.
   e. Calculate the concentration (in mol/dm^3) of 5 g of hydrochloric acid dissolved in 100 cm^3 of solution. Round your final answer to two decimal places.