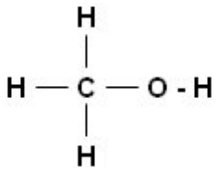
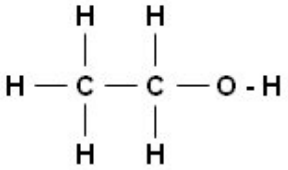
Q1. The structures shown are of the first two members of a homologous series of organic compounds.



Methanol



Ethanol

(a) (i) Complete the diagram for propanol, the next member of the homologous series.

C — C — C

Propanol

(1)

(ii) Which **one** of the statements about ethanol is correct?

Tick (✓) **one** box.

Statement	Tick (✓)
Ethanol dissolves in water to form a neutral solution.	
Ethanol reacts with sodium to produce chlorine.	
Ethanol does **not** burn in air.	

(1)

(b) Ethanoic acid (CH_3COOH) can be produced from ethanol (CH_3CH_2OH).

(i) What type of reaction happens when ethanoic acid is produced from ethanol?

.....

(1)

(ii) State one use of ethanoic acid.

.....

(1)

(Total 4 marks)

Q2. Vinegar can be added to food.

Vinegar is a solution of ethanoic acid in water.

(a) Ethanoic acid is a *weak* acid.

Draw a ring around the correct answer to complete each sentence.

(i) When dissolved in water, an acid forms a solution containing

carbonate ions.
hydrogen ions.
hydroxide ions.

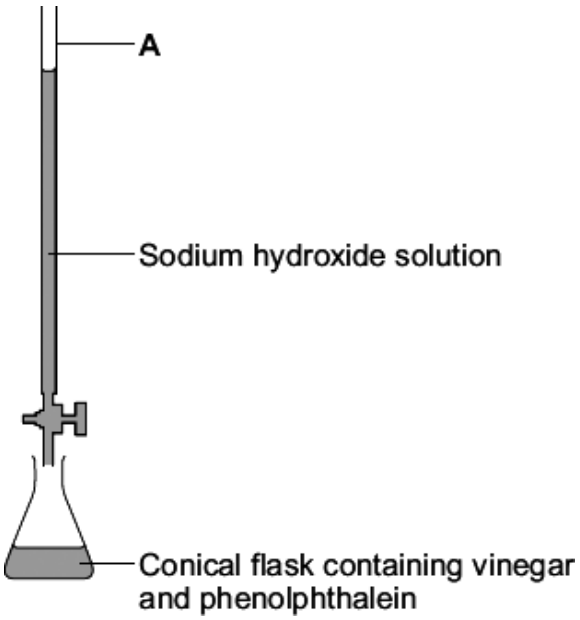
(1)

(ii) Ethanoic acid is a *weak* acid because in water it is

completely ionised.
not ionised.
partially ionised.

(1)

(b) The diagram shows the apparatus used to investigate the amount of ethanoic acid in vinegar.



(i) Draw a ring around the name of the piece of apparatus labelled **A** on the diagram.

burette **measuring cylinder** **pipette**

(1)

(ii) Phenolphthalein is added to the vinegar in the conical flask so that the end point of the titration can be seen.

What type of substance is phenolphthalein?

Draw a ring around the correct answer.

alkali **catalyst** **indicator**

(1)

(iii) How would you know that the end point of the titration has been reached?

.....

.....

(1)

(c) The results of the titration are shown in the table.

	Rough titration	Accurate titrations		
		1	**2**	**3**
Final reading in cm^3	22	21.30	22.50	24.40
Initial reading in cm^3	0	1.00	2.00	4.00
Volume used in cm^3	22	20.30	20.50	20.40

Calculate the best value of the mean volume from these titrations.

.....

.....

.....

Mean volume used = ... cm^3

(2)

(d) 25.0 cm^3 of this vinegar contained 1.25 g of ethanoic acid.

Calculate the mass of ethanoic acid in 1 litre (1000 cm^3) of this vinegar.

.....

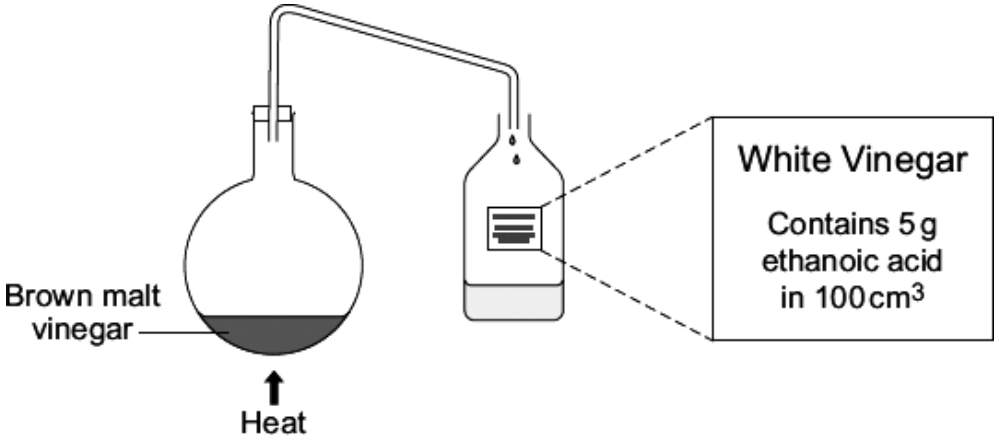
.....

.....

Mass = ... g

(2)
(Total 9 marks)

Q3. White vinegar can be made by distillation of brown malt vinegar.



(a) White vinegar contains only water (boiling point 100 °C) and ethanoic acid (boiling point 118 °C).

Suggest why the brown colour remains in the flask during the distillation.

.....

.....

(1)

(b) Ethanoic acid is a weak acid.

(i) Draw a ring around the correct answer to complete the sentence.

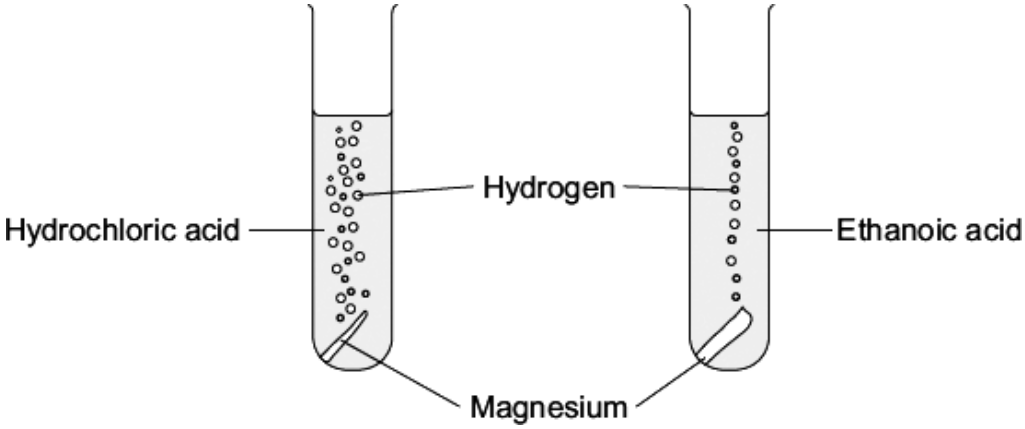
Weak acids are | completely | not | partially | ionised in water.

(1)

(ii) Hydrochloric acid and ethanoic acid were reacted with magnesium metal to produce hydrogen gas.

At the start:

- both acids were the same concentration
- both pieces of magnesium were the same size.



Give **two** observations which show that ethanoic acid is a weaker acid than hydrochloric acid.

1 .....

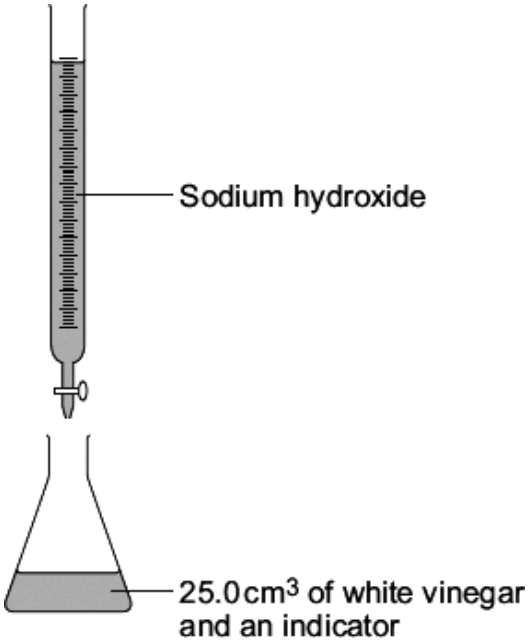
.....

2 .....

.....

(2)

(c) A student did a titration to find out if the white vinegar contains 5 g of ethanoic acid in 100 cm^3.



(i) Choose the correct words from the box to complete the sentences.
Use each word once or not at all.

burette	**conical flask**	**pipette**	**thermometer**

To do this titration 25.0 cm^3 of the white vinegar is measured

using a ..... .

The 25.0 cm^3 of white vinegar is then run into a ..... .

An indicator is added to the white vinegar.

Sodium hydroxide solution is added to the white vinegar

from a ..... .

(3)

(ii) How does the student know when to stop adding the sodium hydroxide solution?

.....

.....

.....

.....

(2)

(d) The titration is repeated three more times. The results are shown in the table.

Titration	**1**	**2**	**3**	**4**
Volume of sodium hydroxide in cm^3	23.5	20.1	19.9	20.0

(i) The student decided that the mean of these results was 20.0 cm^3.

Explain why.
Use the figures from the table in your explanation.

.....

.....

.....

.....

(2)

(ii) From the results, the student calculated that the concentration of the ethanoic acid was 48 g per cubic decimetre.

Did the white vinegar contain 5 g of ethanoic acid in 100 cm^3 ?
Explain your answer.

.....

.....

(1)
(Total 12 marks)