

**Q1.** Vinegar can be added to food. Vinegar is an aqueous solution of ethanoic acid.



Ethanoic acid is a *weak* acid.

(a) Which ion is present in aqueous solutions of all acids?

.....

(1)

(b) What is the difference between the pH of a *weak* acid compared to the pH of a strong acid of the same concentration?

Give a reason for your answer.

.....

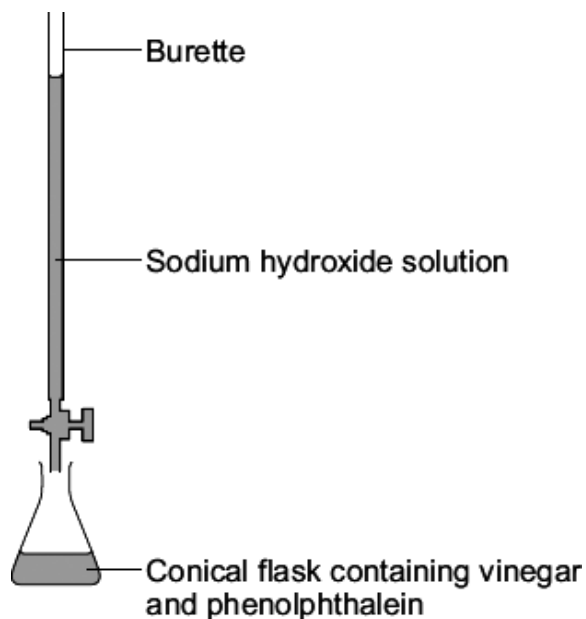
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(2)

- (c) The diagram shows the apparatus used to find the concentration of ethanoic acid in vinegar.



- (i) Why should phenolphthalein indicator be used for this titration instead of methyl orange?

.....  
 .....

(1)

- (ii) 25.00 cm<sup>3</sup> of vinegar was neutralised by 30.50 cm<sup>3</sup> of a solution of sodium hydroxide with a concentration of 0.50 moles per cubic decimetre.

The equation for this reaction is:



Calculate the concentration of ethanoic acid in this vinegar.

.....  
 .....  
 .....  
 .....

Concentration of ethanoic acid in this vinegar = ..... moles per cubic decimetre

(2)

- (d) The concentration of ethanoic acid in a different bottle of vinegar was 0.80 moles per cubic decimetre.

Calculate the mass in grams of ethanoic acid ( $\text{CH}_3\text{COOH}$ ) in  $250\text{ cm}^3$  of this vinegar.

The relative formula mass ( $M_r$ ) of ethanoic acid = 60.

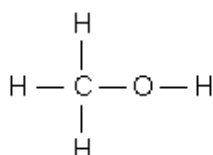
.....  
 .....  
 .....  
 .....

Mass of ethanoic acid = ..... g

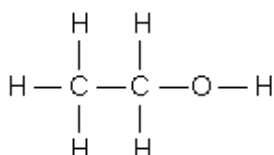
(2)

(Total 8 marks)

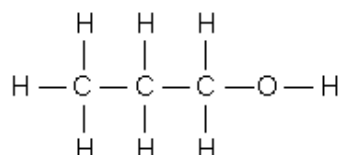
**Q2.** The structures shown are of the first three members of a homologous series of alcohols.



Methanol

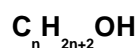
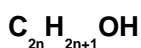
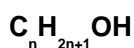


Ethanol



Propanol

- (a) (i) Draw a ring around the correct general formula for alcohols.



(1)

- (ii) What is the formula of the functional group for alcohols?

.....

(1)

- (b) Ethanol is the alcohol used in alcoholic drinks.

- (i) When ethanol dissolves in water the solution formed is **not** alkaline.

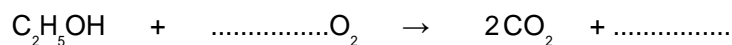
Tick (✓) the reason why the solution formed is **not** alkaline.

Reason	Tick (✓)
Ethanol can be used as a solvent.	
Ethanol dissolves in water to form hydroxide ions.	
Ethanol has only covalent bonds in its molecule.	

(1)

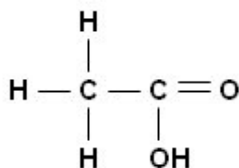
- (ii) Ethanol is used as a fuel because ethanol burns in oxygen.

Complete and balance the chemical equation for this reaction.



(2)

- (c) Ethanol can be oxidised to produce the compound shown.



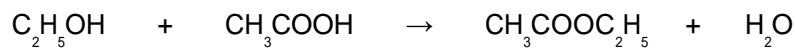
- (i) Draw a ring around the correct answer to complete the sentence.

When this compound dissolves in water, the solution formed is

acidic.
alkaline.
neutral.

(1)

- (ii) Ethanol reacts with this compound to produce the organic compound shown.



Complete the sentence.

The type of organic compound produced is .....

(1)

(Total 7 marks)

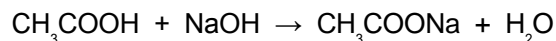
- Q3.** (a) This label has been taken from a bottle of vinegar.



Vinegar is used for seasoning foods. It is a solution of ethanoic acid in water.

In an experiment, it was found that the ethanoic acid present in a 15.000 cm<sup>3</sup> sample of vinegar was neutralised by 45.000 cm<sup>3</sup> of sodium hydroxide solution, of concentration 0.20 moles per cubic decimetre (moles per litre).

The equation which represents this reaction is



Calculate the concentration of the ethanoic acid in this vinegar:

- (i) in moles per cubic decimetre (moles per litre);

.....  
.....  
.....  
.....

Concentration = ..... moles per cubic decimetre

(2)

- (ii) in grams per cubic decimetre (grams per litre).

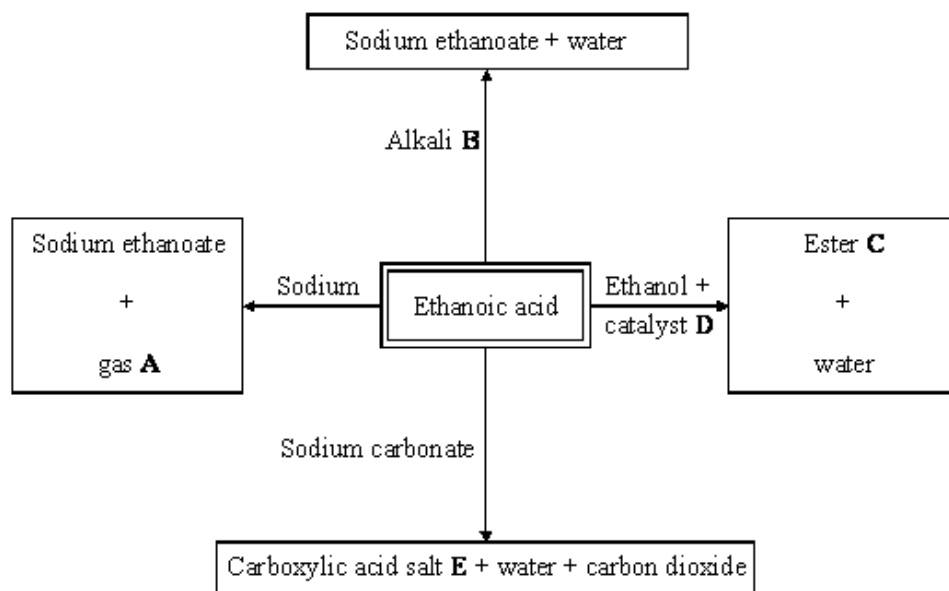
Relative atomic masses: H = 1; C = 12; O = 16.

.....  
.....  
.....

Concentration = ..... grams per cubic decimetre

(2)

- (b) The flow diagram shows some reactions of ethanoic acid.



Give the name of:

(i) gas **A**,

.....

(1)

(ii) alkali **B**,

.....

(1)

(iii) ester **C**,

.....

(1)

(iv) catalyst **D**,

.....

(1)

(v) carboxylic acid salt **E**.

.....

(1)

(Total 9 marks)

