OCR
Oxford Cambridge and RSA

AS Level Chemistry A)

H032/01 Breadth in chemistry

Question Set 11

1. Ethanoic acid, CH_3COOH, is the main dissolved acid in vinegar.

(a) Ethanoic acid is a weak acid.

What is meant by *acid* and *weak acid*?

[1]

(b) Aluminum is reacted with ethanoic acid.

(i) The unbalanced equation for the reaction is shown below.

Balance the equation.

……. $Al(s)$ + ……. $CH_3COOH(aq) \rightarrow$ ……. $(CH_3COO)_3Al(aq)$ + …… $H_2(g)$ **[1]**

(ii) This reaction is a redox reaction.

Deduce which element has been oxidised and which element has been reduced, and state the changes in oxidation number.

[2]

(c) A student plans to determine the concentration, in mol dm^{-3}, of CH_3COOH in a bottle of vinegar. The student will carry out a titration with aqueous barium hydroxide, $Ba(OH)_2(aq)$.

The student's method is outlined below.

- Dilute 10.0 cm^3 of vinegar from the bottle with distilled water and make the solutionup to 250.0 cm^3.
- Add the diluted vinegar to the burette.
- Titrate 25.0 cm^3 volumes of 0.0450 mol dm^{-3} $Ba(OH)_2$ with the diluted vinegar.

The mean titre of the diluted vinegar is 25.45 cm^3.

The reaction in the student's titration is shown below.

$2CH_3COOH(aq) + Ba(OH)_2(aq) \rightarrow (CH_3COO)_2Ba(aq) + 2H_2O(l)$

(i) Calculate the concentration, in mol dm^{-3}, of CH_3COOH in the original bottle of vinegar.

Show your working.

[4]

(ii) Suggest **one** assumption that the student has made that might mean that their calculated concentration of ethanoic acid in the vinegar is invalid.

Predict, with a reason, how the experimental result would differ from the actual concentration of CH_3COOH if the assumption were **not** correct.

[2]

Total Marks for Question Set 11: 10