

A H S N

S.6 Chemistry Practical 2024

Assessment Test Term I

Expected Score: _____

Duration: 1½ hrs

Attempt all questions.

1. You are provided with the following.

FA1 which is a solution of approximately 0.1M HCl.

Substance H which is anhydrous sodium carbonate.

You are required to determine the actual concentration of the hydrochloric acid in FA1 in mol dm^{-3} and also in g dm^{-3} . (Na=23, C=12, O=16, H=1, Cl=35.5)

Procedure

- (i) Weigh accurately 1.3g of solid H into a clean beaker.
- (ii) To the solid in the beaker, add 100cm^3 of distilled water and stir well to dissolve.
- (iii) Transfer the solution in the beaker carefully into a 250cm^3 volumetric flask and make up to the mark with distilled water. Label the solution FA2.
- (iv) Pipette 25cm^3 of FA2 into a clean conical flask. Add 2-3 drops of methyl orange indicator and titrate with FA1 from the burette until you obtain consistent results.

Results

Mass of beaker + H g

Mass of beaker alone ^{40.2} g

Mass of H alone g

Capacity of pipette used cm^3

Final burette reading (cm^3)	25.30	25.10	35.00
Initial burette reading (cm^3)	0.00	0.00	10.00
Volume of FA1 used (cm^3)			

Values used to calculate average volume of FA 1 cm^3

Average volume of FA 1 used cm^3

- (a) Determine the concentration of the sodium carbonate in FA 2 in mol dm^{-3} .

(b) Write the equation for the reaction.

(c) Calculate the number of moles of the hydrochloric acid in FA1 that reacted with the sodium carbonate in FA 2.

(d) Determine the concentration of the hydrochloric acid in FA 1 in

(i) moles per dm^3

(ii) grams per dm^3

2. You are provided with the following;

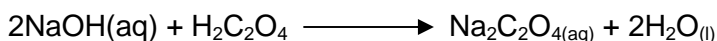
FA1 which is 0.1M sodium hydroxide

FA2 which is a mixture of oxalic acid ($\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$) and sodium oxalate ($\text{Na}_2\text{C}_2\text{O}_4$) containing 12.4gdm^{-3} .

You are required to determine the percentage of sodium oxalate in FA2.

Theory

Sodium hydroxide reacts with oxalic acid according to the following equation.



Procedure

Pipette 25cm^3 of FA1 into a conical flask. Add 2.3 drops of phenolphthalein indicator and titrate with FA2 from the burette.

Record your results in the table below

Capacity of pipette used cm^3

Final / burette reading (cm^3)	20.50	20.30	24.30
Initial burette reading (cm^3)	0.00	0.00	4.00
Volume of FA2 used (cm^3)			

Values used to calculate the average volume of FA2 cm^3

Average volume of FA2 used cm^3

(a) Calculate the number of moles of oxalic acid that reacted with the sodium hydroxide.

(b) Determine the

- (i) concentration of sodium oxalate in FA2 in gdm^3 .
(Na=23, C=12, O=16, H=1)

- (ii) percentage of sodium oxalate in FA2.

3. You are provided with the following;

FA1 which is a mixture of sodium hydroxide and sodium carbonate

FA2 which is a solution of 0.1M hydrochloric acid

You are required to determine the percentage of sodium carbonate in the FA1 mixture.

(Na=23, O=16, C=12, H=1)

Procedure:

- (i) By using a measuring cylinder, measure and transfer 100cm³ of FA1 into a 250cm³ volumetric flask and make up to the mark with distilled water. Label the resultant solution FA3.
- (ii) Pipette 25cm³ of FA3 into a clean conical flask. Add 2-3 drops of phenolphthalein indicator and titrate with FA2 from the burette until the end point is reached. Record your results in table 1 below and then add 2-3 drops of methyl orange indicator to the resultant solution and continue the titration with FA2 until the end point is reached. Record your results in table II.

Volume of pipette usedcm³

Burette readings	Table I			Table II		
	(with phenolphthalein)			(with methyl orange indicator)		
Final burette reading (cm ³)	27.90	28.80	27.80	40.50	41.30	40.30
Initial burette reading (cm ³)	0.00	1.00	0.00	27.90	28.80	27.80
Volume of FA2 (cm ³)						

Average volume of FA2 used for table I

.....

Average volume of FA2 used for table II

.....

(a) Determine the volume of hydrochloric acid in FA2 required for the neutralization of;

(i) Sodium carbonate

.....

(ii) Sodium hydroxide

.....

(b) Calculate the concentration of

(i) Sodium carbonate in FA1 in gdm^{-3}

(ii) Sodium hydroxide in FA1 in gdm^{-3}

(c) Determine the percentage of sodium carbonate in the FA1 mixture