Part-C: Calculation

Normality of sodium thiosulphate = 'Y' cm^3
Volume of sodium thiosulphate = 'X' cm^3
1000 cm^3 1N sodium thiosulphate = 63.54 g of copper
Therefore 'X' cm^3 of 'Y' N sodium thiosulphate = $\frac{63.54*X*Y}{1000}$ g of copper
Amount of copper in 25 cm^3 of sample solution = "A" g of Copper
Amount of copper in given PCB sample is =10 "A" g of Copper

Model Procedure: Part A: Preparation of standard solution

* known weight of $Na_2S_2O_3$ is added to the flask and then water is added to make a solution
- Calculate the Normality of $Na_2S_2O_3$ solution

Part B: Estimation of Cu in given solution of PCB

- Take 25 cc of PCB soln in the flask and add a spatula of fusca (NH_4CNS)
- Heat it to a boil and bring it back to room temp; then add 1 t.t of distilled water
- Then Add 2-3 drops of NH_4OH. We get light blue ppt. Add 1¼ ml of CH_3COOH to dissolve the ppt. Then Add 10% 1 T.T of KI solution. solution turns brown. start titration against $Na_2S_2O_3$
- when the solution turns pale yellow, add Starch (Indicator) to get blue soln
- Continue titration till blue disappears
- Note the readings of burette.

Model Calculation:

let Volume of $Na_2S_2O_3$ = x cm^3

Normality of $Na_2S_2O_3$ = y cm^3

1000 cm^3 of 1N Sodium thiosulphate ($Na_2S_2O_3$) = 63.54g of Cu.

To x cm^3 of yN Sodium thiosulphate ($Na_2S_2O_3$) = $\frac{x \times y \times 63.54}{1000}$ g of Cu.

∴

Amount of Cu in 25 cm^3 of sample solution = N g

Amount of Cu in 250 cm^3 (given) of sample solution

= 10 N g of Copper

Observation and Calculation:

Sol $Na_2S_2O_3$

Part-A: Preparation of Copper solution

Sample Details	Sample
Weight of $Na_2S_2O_3$ + Weighing Bottle	~~4.9807~~ 4.4858 g
Weight of empty Weighing Bottle	3.7695 g
Weight of the $Na_2S_2O_3$ taken	1.2150 g

Normality of $Na_2S_2O_3$ = Mass of $Na_2S_2O_3$ / Gram Equivalent weight of $Na_2S_2O_3$ (248.17)

Weight *10

$$N = \frac{1.2150}{248.17} = 0.0048$$

Part-B: Estimation of Copper in Sample solution

Burette readings (in cm^3)	Trial-I	Trial-II	Trial-III	Expected Value
Final	10.6	~~8.9~~ 8.8	8.6	8.7
Initial	0	0	0	
Volume of $Na_2S_2O_3$ run down	10.6	~~8.9~~ 8.8	8.6	

Part-C: Calculation

Normality of $Na_2S_2O_3 = \frac{1.2150}{248.17} = 0.004895 \simeq 0.0049$

Volume of $Na_2S_2O_3$ = 8.8ml

1000 ml of 1N $Na_2S_2O_3$ → 63.54g of Cu

8.8 ml of 0.0049N $Na_2S_2O_3$ → ~~xg of Cu~~

$$\frac{63.54 \times 8.8 \times 0.00489}{1000} = 0.00273g$$

Amount of Cu in 25ml sol = 0.0027g

Amount of Cu in 250ml solution = 0.027g

∴ Amount of Cu in given PCB solution = ~~0.027g~~ 0.027g

Inference:

The amount of Cu extracted from 250ml of PCB solution is approximately 0.027g

- What we can infer from the final solution of our experiment is that a lot of copper is wasted by disposing many PCB. We can extract profitably a good amount of Cu from these PCB by our experiment

Relevance to Society & Environment:

- Using this method we can extract the Copper from the disposed PCB
- Since Cu is a non-renewable resource, extracting it back from PCB & using it again reduces stress improves the environment which is destroyed by mining
- We can also reduce e-waste which reduces waste by a great amount

Report:

Amount of copper in given PCB sample is = 0.027g

Evaluation of Experiment - 1		
Components	**Marks**	
	Max	**Obtained**
Model Procedure & Calculation	7+3	10
Burette Reading & Execution	20+4	24
Inference & Societal Relevance	02+02	02
Total	40	36
Signature of Teacher		20/12/22