

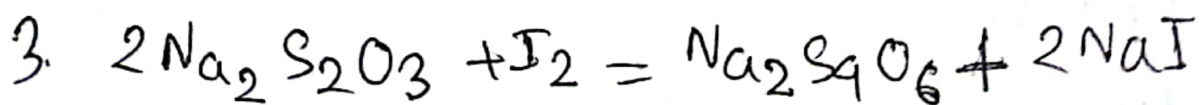
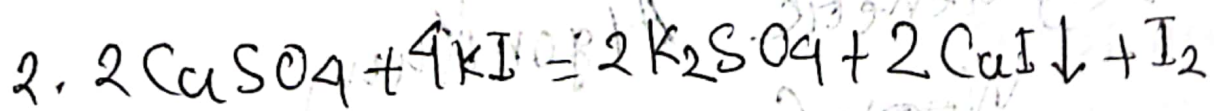
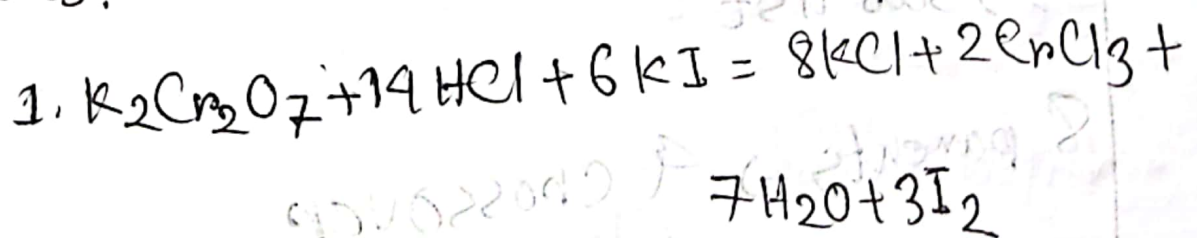
EXP 5: Estimation of Copper (Cu) contained in a supplied solution of copper salt by iodometric method.

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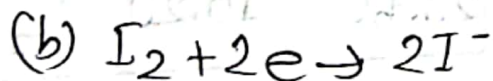
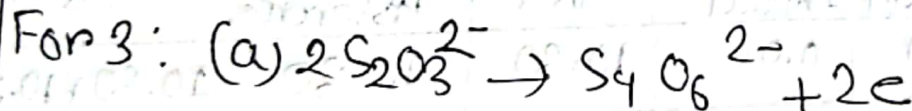
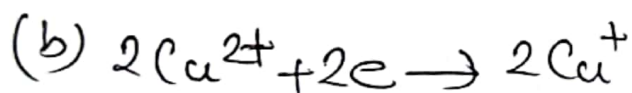
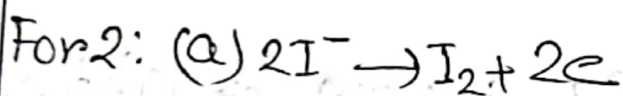
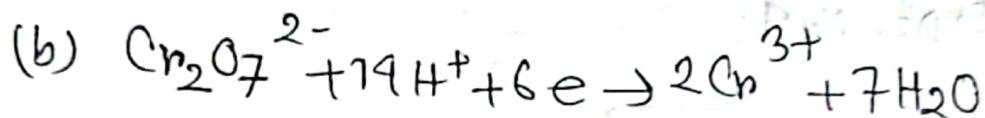
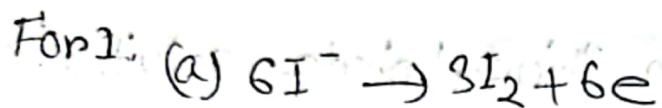
Theory:

Methods: Oxidation-Reduction Titration

Reactions:



Half Reactions:



Indicator?

Starch is a indicator which specify the presence of  $I_2$ . but it is not a redox indicator

Experimental Data:

(A) Standardize sodium thiosulphate solution as  
Expt. No. 4:

Table-1: Standardization of supplied  $\text{Na}_2\text{S}_2\text{O}_3$  solution  
against standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution by oxidation-reduction  
titration.

No. of reading	Vol. of $\text{K}_2\text{Cr}_2\text{O}_7$ (in ml)	Vol of $\text{Na}_2\text{S}_2\text{O}_3$ (burette) (in ml)			Mean (in ml)
		Initial	Final	Difference	
1	10	0.00	10.30	10.30	$\frac{10.30 + 10.20}{2}$
2	10	10.30	20.50	10.20	$= 10.25$

The strength of  $\text{K}_2\text{Cr}_2\text{O}_7$  solution =  $\frac{\text{Weight taken (in gm)} \times 0.1}{0.49} \text{ (N)}$

$$= \frac{0.65 \times 0.1}{0.49} \text{ N}$$
$$= 0.13 \text{ N}$$

The strength of supplied  $\text{Na}_2\text{S}_2\text{O}_3$  solution (S):

$$V_{\text{thio}} \times N_{\text{thio}} = V_{\text{dichromate}} \times N_{\text{dichromate}}$$



$$\Rightarrow 10.25 \times N_{\text{thio}} = 10 \times 0.13$$

$$\Rightarrow N_{\text{thio}} = \frac{10 \times 0.13}{10.25}$$

$$\Rightarrow N_{\text{thio}} = 0.127$$

(8) Estimation of  $\text{Cu}^{2+}$  ions:

Table 2: Determination of the amount of copper in a supplied solution of blue vitriol by iodometric method.

No. of reading	Vol. of Copper Soln (ml)	Vol of $\text{Na}_2\text{S}_2\text{O}_3$ (burette) (in ml)			Mean (in ml) (v)
		Initial	Final	Difference	
1	10	0.00	3.50	3.50	$\frac{3.50 + 3.30 + 3.40 + 3.35}{4}$ $= 3.3875$
2	10	3.50	6.80	3.30	
3	10	6.80	10.20	3.40	
4	10	10.20	13.55	3.35	

Calculations:  $2\text{CuSO}_4 \equiv \text{I}_2 \equiv 2\text{Na}_2\text{S}_2\text{O}_3$

1 ml 1N  $\text{Na}_2\text{S}_2\text{O}_3 \equiv 0.06354$  gm of  $\text{Cu}^{2+}$

Amount of copper ions in 10 ml of copper salt solution

$$= 0.06354 \times V \times 5 \text{ gm}$$

$$= 0.06354 \times 3.3875 \times 0.127 \text{ gm}$$

$$= \cancel{0.0031} 0.027 \text{ gm}$$

Amount of copper ions in 500 ml of copper salt solution

$$= 0.06354 \times V \times 50 \text{ gm}$$

$$= 0.06354 \times \cancel{3.3875} 3.3875 \times 0.127 \times 50 \text{ gm}$$

$$= 1.367 \text{ gm}$$

Observe value of  $\text{Cu}^{2+}$  (in 500 ml solution)

$$= 1.367 \text{ gm}$$

Known value of  $\text{Cu}^{2+}$  (in 500 ml solution)

$$= \frac{63.54 \times \text{amount Cu-salt taken}}{249.68}$$

$$= \frac{63.54 \times 4.25}{249.68} = 1.082 \text{ gm}$$

Results: The amount of copper ions in 500 ml of copper salt solution is 1.367 gm

Percentage of Error:

$$= \frac{\text{known value} - \text{observed value}}{\text{known value}} \times 100 -$$

$$= \frac{1.082 - 1.367}{1.082} \times 100$$

$$= -0.2634 \times 100$$

$$= -26.34\%$$