

Redox Titration

Q.1. Metallic tin in presence of HCl is oxidized by $K_2Cr_2O_7$ to stannic chloride. The volume of decinormal dichromate solution would be reduced by 1 g of tin is :

- (A) 336.48 mL
- (B) 336.58 mL
- (C) 336.98 mL
- (D) 337.98 m

Q.2. 5.5 g of a mixture of $FeSO_4 \cdot 7H_2O$ and $Fe_2(SO_4)_3 \cdot 9H_2O$ required 5.4 mL of 0.1N $KMnO_4$ solution for complete oxidation. The mole of hydrated ferric sulphate in mixture is:

- (A) 9.5×10^{-3}
- (B) 9.5×10^3
- (C) 9.5×10^4
- (D) 9.5×10^{-4}

Q.3. 0.5 g sample containing MnO_2 is treated with HCl, liberating Cl_2 . The Cl_2 is passed into a solution of KI and 30.0 mL of 0.1M $Na_2S_2O_3$ are required to titrate the liberated iodine. The percentage of MnO_2 in sample, atomic weight of Mn being 55, is :

- (A) 26.0%
- (B) 26.1%
- (C) 26.2%
- (D) 26.3%

Q.4. In an ore, the only oxidizable material is Sn^{2+} . This ore is titrated with a dichromate solution containing 2.5 g of $K_2Cr_2O_7$ in 0.5 litre. A 0.40 g sample of the ore required 10.0 cm^3 of titrant to reach equivalent point. The percentage of tin in ore is :

- (A) 10%
- (B) 12%
- (C) 15%
- (D) 18%

Q.5. 20 mL of a solution containing 0.2 g of impure sample of H_2O_2 reacts with 0.316 g of KMnO_4 (acidic). The purity of H_2O_2 is :

- (A) 70%
- (B) 75%
- (C) 80%
- (D) 85%

Q.6. 20 mL of a solution containing 0.2 g of impure sample of H_2O_2 reacts with 0.316 g of KMnO_4 (acidic). The volume of dry O_2 evolved at 27°C and 750 mmP is

- (A) 124.79 mL
- (B) 124.69 mL
- (C) 124.59 mL
- (D) 124.56 mL

Q.7. 0.56 g of lime stone was treated with oxalic acid to give CaC_2O_4 . The precipitate decolourized 45 mL of 0.2N KMnO_4 in acid medium. The percentage of CaO in lime stone is :

- (A) 35%
- (B) 40%
- (C) 45%
- (D) 50%

Q.8. 5.7 g of bleaching powder was suspended in 500 mL of water. 25 mL of this suspension on treatment with KI and HCl liberated iodine which reacted with 24.33 mL of N/10 $\text{Na}_2\text{S}_2\text{O}_3$. The percentage of available Cl_2 in bleaching powder is :

- (A) 30.00%
- (B) 30.33%
- (C) 30.50%
- (D) 30.65%

Q.9. A solution of 0.1 M KMnO_4 is used for the reaction :

$\text{S}_2\text{O}_3^{2-} + 2\text{MnO}_4^- + \text{H}_2\text{O} \rightarrow \text{MnO}_2 + \text{SO}_4^{2-} + \text{OH}^-$ The volume of solution in mL required to react with 0.158 g of $\text{Na}_2\text{S}_2\text{O}_3$ is :

- (A) 26.27 mL
- (B) 26.47 mL

(C) 26.67 mL

(D) 26.87 mL

Q.10. A solution of 0.2 g of a compound containing Cu^{2+} and $\text{C}_2\text{O}_4^{2-}$ ions on titration with 0.02M KMnO_4 in presence of H_2SO_4 consumes 22.6 mL oxidant. The resulting solution is neutralized by Na_2CO_3 , acidified with dilute CH_3COOH and titrated with excess of KI. The liberated I_2 required 11.3 mL of 0.05M $\text{Na}_2\text{S}_2\text{O}_3$ for complete reduction. The mole ratio of Cu^{2+} and $\text{C}_2\text{O}_4^{2-}$ in the compound is :

(A) 1 : 2

(B) 5 : 1

(C) 56 : 11

(D) 2 : 3

Q.11. 1 g sample of AgNO_3 is dissolved in 50 mL of water. It is titrated with 50 mL of KI solution. The AgI precipitated is filtered off. Excess of KI in filtrate is titrated with M/10 KIO_3 in presence of 6M HCl till all I^- converted into ICl . It requires 50 mL of M/10 KIO_3 solution. 20mL of the same stock solution of KI requires 30 mL of M/10 KIO_3 under similar conditions. The reaction is :



The percentage of AgNO_3 in the sample is :

(A) 75%

(B) 80%

(C) 85%

(D) 90%

Q.12. 1.6 g of pyrolusite ore was treated with 50 mL of 1.0 N oxalic acid and some sulphuric acid. The oxalic acid left undecomposed was raised to 250 mL in a flask. 25 mL of this solution when treated with 0.1 N KMnO_4 required 32 mL of the solution. The percentage of pure MnO_2 in the sample is : .

(A) 45.88%

(B) 46.88%

(C) 47.88%

(D) 48.88%

Q.13. A 1 g sample of Fe_2O_3 solid of 55.2% purity is dissolved in acid and reduced by heating the solution with zinc dust. The resultant solution is cooled and made upto 100 mL. An aliquot of 25 mL of this solution requires 17 mL of 0.0167M solution of an oxidant for titration. The number of electrons taken up by oxidant in the above titration is :

- (A) 3
- (B) 5
- (C) 6
- (D) 4

Q.14. A 5.0 ml solution of H_2O_2 liberates 0.508 g of iodine from an acidified KI solution. The strength of H_2O_2 solution in terms of volume strength at STP is :

- (A) 4.45%
- (B) 4.46%
- (C) 4.47%
- (D) 4.48%