



## DPP-2 [Redox Titration]

### Chapter: Practical Physical Chemistry

*“Sab log talent ki baat karte hain... Par asli game un logon ne jeeta hai...  
Jinhone boring dinon mein bhi kaam kiya.”*

#### TYPE 1 : Fundamentals of Redox Titration

**Q.1 The reagent which forces other molecule or ion to liberate electron is**

- |                     |              |
|---------------------|--------------|
| (1) Oxidizing agent | (3) Molecule |
| (2) Reducing agent  | (4) Atom     |

**Q.2 The reagent which forces other molecule or ion to capture electron is**

- |                     |              |
|---------------------|--------------|
| (1) Oxidizing agent | (3) Molecule |
| (2) Reducing agent  | (4) Atom     |

**Q.3 Which is the self indicator used in redox titration?**

- |                               |                   |
|-------------------------------|-------------------|
| (1) Ferrous ammonium sulphate | (3) Both          |
| (2) $\text{KMnO}_4$           | (4) None of these |

**Q.4 Which meniscus is read in burette in case of  $\text{KMnO}_4$ ?**

- |           |                   |
|-----------|-------------------|
| (1) Upper | (3) Middle        |
| (2) Lower | (4) None of these |

**Q.5 The titration of  $\text{KMnO}_4$  against oxalic acid or  $\text{FeSO}_4$  is example of**

- |                             |                              |
|-----------------------------|------------------------------|
| (1) Iodometric titration    | (3) Potentiometric titration |
| (2) Precipitation titration | (4) Redox titration          |

**Q.6 Amount of oxalic acid present in a solution can be determined by its titration with  $\text{KMnO}_4$  solution in the presence of  $\text{H}_2\text{SO}_4$ . The titration gives unsatisfactory results when carried out in the presence of  $\text{HCl}$ , because  $\text{HCl}$**

- (1) Furnishes  $H^+$  ions in addition to those from oxalic acid  
 (2) Reduces permanganate to  $Mn^{2+}$
- (3) Oxidises oxalic acid to carbon dioxide and water  
 (4) Gets oxidised by oxalic acid to chlorine

**Q.7 Match the following:**

- |                            |   |                                    |
|----------------------------|---|------------------------------------|
| 1 Neutralization Titration | P | Formation of coordination compound |
| 2 Precipitation titration  | Q | Oxidation reduction reaction       |
| 3 Redox titration          | R | Formation of salt and water        |
| 4 Complexometric titration | S | Formation of precipitate           |
- (1) 1-R, 2-S, 3-Q, 4-P  
 (2) 1-Q, 2-R, 3-P, 4-S  
 (3) 1-R, 2-P, 3-S, 4-Q  
 (4) 1-S, 2-Q, 3-R, 4-P

**Q.8 Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.**

**Assertion A:** Permanganate titrations are not performed in presence of hydrochloric acid.

**Reason R:** Chlorine is formed as a consequence of oxidation of hydrochloric acid.

In the light of the above statements, choose the correct answer from the options given below.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.  
 (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.  
 (3) Assertion is true but Reason is false.  
 (4) Assertion is false but Reason is true.

**TYPE 2 : Equivalent Weight & Normality Calculations**
**Q.9 The equivalent mass of potassium permanganate in alkaline medium is**

- (1)  $\frac{\text{Molar Mass}}{5}$   
 (2)  $\frac{\text{Molar Mass}}{3}$   
 (3)  $\frac{\text{Molar Mass}}{2}$   
 (4) Molar mass itself

**Q.10 The equivalent weight of  $KMnO_4$  in alkaline medium as an oxidant will be**

- (1) 31.60  
 (2) 52.66  
 (3) 79.00  
 (4) 158.00

**Q.11 The dark purple colour of  $KMnO_4$  disappears in the titration with oxalic acid in acidic medium. The overall change in the oxidation number of manganese in the reaction is**

- (1) 5  
 (2) 1  
 (3) 7  
 (4) 2

**Q.12 The weight of  $H_2C_2O_4 \cdot 2H_2O$  (MW = 126) required to make 500 ml of 0.2 N solution is**

- (1) 6.3 gm (3) 5.6 gm  
(2) 3.6 gm (4) 4.6 gm

**Q.13** The weight of  $\text{KMnO}_4$  required to make 500 ml of 0.1 N  $\text{KMnO}_4$  for titration in acidic medium is ..... gm

- (1) 6.15 (3) 2.65  
(2) 1.58 (4) 4.12

### TYPE 3 : Iodometry, Iodimetry & Reactions

**Q.14** What is the colour of the starch iodine complex formed?

- (1) Yellow (3) Green  
(2) Blue (4) Red

**Q.15** In the reaction  $\text{I}_2 + 2\text{S}_2\text{O}_3^{2-} \rightarrow 2\text{I}^- + \text{S}_4\text{O}_6^{2-}$ ; the equivalent weight of iodine will be equal to

- (1) Molecular weight (3) 1/4 the molecular weight  
(2) 1/2 the molecular weight (4) Twice the molecular weight

**Q.16** In the standardization of  $\text{Na}_2\text{S}_2\text{O}_3$  using  $\text{K}_2\text{Cr}_2\text{O}_7$  by iodometry, the equivalent weight of  $\text{K}_2\text{Cr}_2\text{O}_7$  is

- (1) (Molecular weight)/2 (3) (Molecular weight)/3  
(2) (Molecular weight)/6 (4) Same as molecular weight

**Q.17** In the iodometric estimation in laboratory, which process is involved?

- (1)  $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{I}^- \rightarrow 2\text{Cr}^{3+} + \text{I}_2$ ,  $\text{I}_2 + \text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-} + \text{I}^-$   
(2)  $\text{MnO}_4^- + \text{H}^+ + \text{I}^- \rightarrow \text{MnO}_2 + \text{I}_2$ ,  $\text{I}_2 + \text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-} + \text{I}^-$   
(3)  $\text{MnO}_4^- + \text{OH}^- + \text{I}^- \rightarrow \text{MnO}_2 + \text{I}_2$ ,  $\text{I}_2 + \text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-} + \text{I}^-$   
(4)  $\text{Cr}_2\text{O}_7^{2-} + \text{OH}^- + \text{I}^- \rightarrow 2\text{Cr}^{3+} + \text{I}_2$ ,  $\text{I}_2 + \text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-} + \text{I}^-$

**Q.18**  $\text{Cu}^{2+}$  salt reacts with potassium iodide to give

- (1)  $\text{Cu}_2\text{I}_2$  (2)  $\text{Cu}_2\text{I}_3$  (3)  $\text{CuI}_2$  (4)  $\text{Cu}(\text{I}_3)_2$

**Q.19** An indicator 'X' is used for studying the effect of variation in concentration of iodide on the rate of reaction of iodide ion with  $\text{H}_2\text{O}_2$  at room temperature. The indicator 'X' forms blue coloured complex with compound 'A' present in the solution. The indicator 'X' and compound 'A' respectively are

- (1) Starch and iodine  
(2) Methyl orange and  $\text{H}_2\text{O}_2$
- (3) Starch and  $\text{H}_2\text{O}_2$   
(4) Methyl orange and iodine

**Q.20** When  $\text{Cu}^{2+}$  ion is treated with KI, a white precipitate X appears in solution. The solution is titrated with sodium thiosulphate, the compound Y is formed. X and Y respectively are

- (1)  $\text{X} = \text{Cu}_2\text{I}_2$ ;  $\text{Y} = \text{Na}_2\text{S}_4\text{O}_5$   
(2)  $\text{X} = \text{Cu}_2\text{I}_2$ ;  $\text{Y} = \text{Na}_2\text{S}_4\text{O}_6$
- (3)  $\text{X} = \text{CuI}_2$ ;  $\text{Y} = \text{Na}_2\text{S}_4\text{O}_3$   
(4)  $\text{X} = \text{CuI}_2$ ;  $\text{Y} = \text{Na}_2\text{S}_4\text{O}_6$