

CLASS XI CHE CH: 7

SET 3 – Redox Titrations & Electrochemical Concepts

1. In a redox titration, one of the reactants acts as –
 - a) Oxidising agent
 - b) Reducing agent
 - c) Both (a) and (b)
 - d) Neither
2. The end point in redox titrations is usually detected by –
 - a) pH indicator
 - b) Redox indicator
 - c) Temperature change
 - d) Pressure change
3. Which of the following is a redox indicator?
 - a) Phenolphthalein
 - b) Methyl orange
 - c) Diphenylamine
 - d) Thymol blue
4. Potassium permanganate acts as –
 - a) Reducing agent
 - b) Oxidising agent
 - c) Both
 - d) None
5. In acidic medium, KMnO_4 is reduced to –
 - a) MnO_2
 - b) Mn^{2+}
 - c) Mn^{3+}
 - d) Mn^{4+}
6. In neutral medium, KMnO_4 is reduced to –
 - a) Mn^{2+}
 - b) MnO_2
 - c) MnO_4^{2-}
 - d) Mn^{3+}
7. In alkaline medium, KMnO_4 is reduced to –
 - a) MnO_2
 - b) Mn^{2+}
 - c) MnO_4^{2-}
 - d) Mn^{3+}
8. In the reaction $\text{MnO}_4^- \rightarrow \text{Mn}^{2+}$, number of electrons gained is –
 - a) 2
 - b) 3
 - c) 5
 - d) 7
9. In the titration between oxalic acid and KMnO_4 , oxalic acid acts as –
 - a) Oxidising agent

CLASS XI CHE CH: 7

- b) Reducing agent
 - c) Catalyst
 - d) Salt
10. The reaction between Fe^{2+} and KMnO_4 is an example of –
- a) Acid-base reaction
 - b) Redox reaction
 - c) Precipitation reaction
 - d) None
11. Equivalent weight of KMnO_4 in acidic medium is –
- a) $M/5$
 - b) $M/3$
 - c) $M/2$
 - d) $M/1$
12. Equivalent weight of KMnO_4 in neutral medium is –
- a) $M/3$
 - b) $M/5$
 - c) $M/2$
 - d) M
13. Equivalent weight of KMnO_4 in alkaline medium is –
- a) $M/5$
 - b) $M/3$
 - c) $M/2$
 - d) M
14. In redox titration, the oxidising agent is titrated against a –
- a) Reducing agent
 - b) Oxidising agent
 - c) Acid
 - d) Base
15. $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$ is –
- a) Oxidation
 - b) Reduction
 - c) Disproportionation
 - d) None
16. $\text{Mn}^{7+} \rightarrow \text{Mn}^{2+}$ is –
- a) Oxidation
 - b) Reduction
 - c) Both
 - d) None
17. Which reagent is used in the estimation of Fe^{2+} in presence of H_2SO_4 ?
- a) KMnO_4
 - b) $\text{K}_2\text{Cr}_2\text{O}_7$
 - c) I_2
 - d) $\text{Na}_2\text{S}_2\text{O}_3$
18. Oxidation number of Mn changes from +7 to +2 when KMnO_4 reacts in –
- a) Acidic medium

CLASS XI CHE CH: 7

- b) Neutral medium
 - c) Basic medium
 - d) Both b and c
19. The reducing agent in the reaction between FeSO_4 and KMnO_4 is –
- a) Fe^{2+}
 - b) Fe^{3+}
 - c) Mn^{2+}
 - d) MnO_4^-
20. Redox reactions are also known as –
- a) Electron transfer reactions
 - b) Precipitation reactions
 - c) Acid-base reactions
 - d) Double displacement
21. The apparatus used to measure electrode potential is –
- a) Conductivity meter
 - b) Potentiometer
 - c) Galvanometer
 - d) Ammeter
22. Standard electrode potential is measured at –
- a) 1 atm, 1 M, 25°C
 - b) 1 atm, 0.1 M, 0°C
 - c) 1 atm, 1 M, 0°C
 - d) 1 atm, 1 M, 37°C
23. In electrochemical cell, oxidation occurs at –
- a) Cathode
 - b) Anode
 - c) Both
 - d) None
24. In electrochemical cell, reduction occurs at –
- a) Anode
 - b) Cathode
 - c) Both
 - d) None
25. In Daniell cell, oxidation takes place at –
- a) Zinc electrode
 - b) Copper electrode
 - c) Both
 - d) None
26. In Daniell cell, reduction takes place at –
- a) Zinc electrode
 - b) Copper electrode
 - c) Both
 - d) None
27. In Daniell cell, electrons flow from –
- a) Cu to Zn

CLASS XI CHE CH: 7

- b) Zn to Cu
 - c) Both directions
 - d) None
28. Salt bridge is used to –
- a) Maintain electrical neutrality
 - b) Prevent charge accumulation
 - c) Complete the circuit
 - d) All of these
29. In salt bridge, ions move due to –
- a) Diffusion
 - b) Osmosis
 - c) Migration
 - d) Both a and c
30. Cell potential is measured in –
- a) Ampere
 - b) Volt
 - c) Ohm
 - d) Joule
31. Cell potential (E°_{cell}) =
- a) $E^\circ_{\text{cathode}} + E^\circ_{\text{anode}}$
 - b) $E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$
 - c) $E^\circ_{\text{anode}} - E^\circ_{\text{cathode}}$
 - d) None
32. If E°_{cell} is positive, the reaction is –
- a) Spontaneous
 - b) Non-spontaneous
 - c) Equilibrium
 - d) None
33. If E°_{cell} is negative, the reaction is –
- a) Spontaneous
 - b) Non-spontaneous
 - c) Both
 - d) None
34. The standard hydrogen electrode potential is –
- a) +1 V
 - b) 0 V
 - c) -1 V
 - d) +0.5 V
35. The cell notation for Daniell cell is –
- a) $\text{Cu}|\text{Cu}^{2+}||\text{Zn}^{2+}|\text{Zn}$
 - b) $\text{Zn}|\text{Zn}^{2+}||\text{Cu}^{2+}|\text{Cu}$
 - c) $\text{Cu}^{2+}|\text{Cu}||\text{Zn}^{2+}|\text{Zn}$
 - d) None
36. The function of salt bridge is to –
- a) Allow electron flow

CLASS XI CHE CH: 7

- b) Maintain ionic balance
 - c) Prevent leakage
 - d) Provide current
37. The Nernst equation relates –
- a) E_{cell} with concentration
 - b) Conductivity with temperature
 - c) Potential with time
 - d) None
38. Nernst equation is given by –
- a) $E = E^\circ - (RT/nF) \ln Q$
 - b) $E = E^\circ + (RT/nF) \ln Q$
 - c) $E = E^\circ + (nF/RT) \ln Q$
 - d) $E = E^\circ - nF/RT$
39. In Nernst equation, F represents –
- a) Faraday constant
 - b) Force
 - c) Frequency
 - d) Free energy
40. Faraday constant (F) equals –
- a) 96500 C mol⁻¹
 - b) 96500 J mol⁻¹
 - c) 1.6×10^{-19} C
 - d) 6.023×10^{23}
41. When concentration of products increases, E_{cell} –
- a) Increases
 - b) Decreases
 - c) Remains constant
 - d) Doubles
42. When concentration of reactants increases, E_{cell} –
- a) Increases
 - b) Decreases
 - c) Unchanged
 - d) Doubles
43. ΔG° and E[°]_{cell} are related by –
- a) $\Delta G^\circ = nFE^\circ_{\text{cell}}$
 - b) $\Delta G^\circ = -nFE^\circ_{\text{cell}}$
 - c) $\Delta G^\circ = RT \ln K$
 - d) $\Delta G^\circ = -RT \ln K$
44. If ΔG° is negative, E[°]_{cell} is –
- a) Positive
 - b) Negative
 - c) Zero
 - d) None
45. The potential of the hydrogen electrode depends on –
- a) H⁺ ion concentration

CLASS XI CHE CH: 7

- b) Pressure of H_2 gas
c) Temperature
d) All of these
46. Which of the following is not a redox reaction?
a) $H_2 + Cl_2 \rightarrow 2HCl$
b) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
c) $H_2O + H_2SO_4 \rightarrow H_3O^+ + HSO_4^-$
d) $2Na + Cl_2 \rightarrow 2NaCl$
47. Cell reaction in Daniell cell is –
a) $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$
b) $Cu + Zn^{2+} \rightarrow Cu^{2+} + Zn$
c) $Zn^{2+} + Cu^{2+} \rightarrow Zn + Cu$
d) None
48. Which type of reaction occurs in electrochemical cell?
a) Redox
b) Precipitation
c) Neutralisation
d) None
49. EMF of a cell depends on –
a) Nature of reactants
b) Temperature
c) Concentration of ions
d) All of these
50. The cell reaction is spontaneous if –
a) $E_{cell} > 0$
b) $E_{cell} < 0$
c) $E_{cell} = 0$
d) E_{cell} is undefined

Answers – SET 3

- 1–c 2–b 3–c 4–b 5–b 6–b 7–c 8–c 9–b 10–b
11–a 12–b 13–b 14–a 15–a 16–b 17–a 18–a 19–a 20–a
21–b 22–a 23–b 24–b 25–a 26–b 27–b 28–d 29–d 30–b
31–b 32–a 33–b 34–b 35–b 36–b 37–a 38–a 39–a 40–a
41–b 42–a 43–b 44–a 45–d 46–c 47–a 48–a 49–d 50–a