INDIAN SCHOOL MUSCAT
SENIOR SECTION
DEPARTMENT OF CHEMISTRY
CLASS XII
CHAPTER –ELECTRO CHEMISTRY
OBJECTIVE TYPE QUESTIONS

Multiple choice type questions

1. Which of the following statements regarding the variations of resistance with temperature occur during electrolytic and metallic conductions?
   a) increase in electrolytic, decrease in metallic (b) decrease in electrolytic, increase in metallic
   (c) increase in both (d) decrease in both
2. An electrochemical cell can behave like an electrolytic cell when _____.
   (a) Ecell = 0
   (b) Ecell > Eext
   (c) Eext > Ecell
   (d) Ecell = Eext
3. The cell constant of a conductivity cell _____.
   (a) changes with change of electrolyte.
   (b) changes with change of concentration of electrolyte.
   (c) changes with temperature of electrolyte.
   (d) remains constant for a cell
4. The positive value of the standard electrode potential of Cu^{2+}/Cu indicates that _____
   (a) this redox couple is a stronger reducing agent than the H^{+}/H_2 couple.
   (b) this redox couple is a stronger oxidising agent than H^{+}/H_2.
   (c) Cu can displace H_2 from acid.
   (d) (d)Cu cannot displace H_2 from acid.
5. Molar conductivity of ionic solution depends on _____.
   (a) temperature.
   (b) distance between electrodes.
   (c) concentration of electrolytes in solution.
   (d) surface area of electrodes
6. Standard reduction electrode potentials of three metals A, B and C are respectively+ 0.5V,-3.0V and - 1 .2 V. The reducing powers of these metals are
   (a) B > C > A (b) A > B > C
   (c) C > B > A (d) A > C > B
7. The E^0 for half cells Fe / Fe^{2+} and Cu / Cu^{2+} are-0.44 V and + 0.32 V respectively. Then
   (a) Cu^{2+} oxidises Fe (b) Cu^{2+} oxidises Fe^{2+}
   (c) Cu oxidises Fe^{2+} (d) Cu reduces Fe^{2+}

8. If 0.01 M solution of an electrolyte has a resistance of 40 ohms in a cell having a cell constant of 0.4 cm^{-1}, then its molar conductance in ohm^{-1} cm^2 mol^{-1} is
(a) 10^2 (b) 10^4
(c) 10 (d) 10^3

9. According to Nernst equation, which is not correct if Q = Kc

(a) $E_{cell} = 0$ (b) $\frac{RT}{nF} \ln Q = E^\circ_{cell}$

(c) $K_c = e^{\frac{nFE^\circ_{cell}}{RT}}$ (d) $E_{cell} = E^\circ_{cell}$

10. What is the standard cell potential E° for an electrochemical cell in which the following reaction takes place spontaneously ?

$$Cl_2(g) + 2Br^- \rightarrow Br_2(aq) + 2Cl^- \Delta G^\circ = -50.6 \text{ kJ}$$

a) 1.2 V (b) 0.53 V
(c) 0.26 V (d) –0.53 V

11. Molar conductivities (Λm) at infinite dilution of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.0 S cm^2 mol^{-1} respectively. $\Lambda^0 m$ for CH_3COOH will be
(a) 425.5 S cm^2 mol^{-1} (b) 180.5 S cm^2 mol^{-1}
(c) 290.8 S cm^2 mol^{-1} (d) 390.5 S cm^2 mol^{-1}

12. The conductance of a solution of an electrolyte is equal to that of its specific conductance. The cell constant of the conductivity cell is equal to
(a) resistance (b) faraday
(c) zero (d) unity

13. During conductivity measurement (based on Wheatstone bridge principle) using conductivity cell, alternating current (AC) is used because a direct current would lead to
(a) association and ionization
(b) electrolysis and polarization
(c) polymerization and polarization
(d) polarization

14. Which of the following solutions of KCl will have the highest value of specific conductance?
(a) 0.01 M (b) 0.1 M (c) 1.0 M (d) 0.5 M

15. The value of molar conductance of HCl is greater than that of NaCl at a given temperature and concentration because
(a) ionic mobility of HCl is greater than that of NaCl
(b) the dipole moment of NaCl is greater than that of HCl
(c) NaCl is more ionic than HCl
(d) HCl is Bronsted acid and NaCl is a salt of a strong acid and strong base

16. The resistance of 0.5 M solution of an electrolyte in a cell was found to be 50Ω. If the electrodes in the cell are 2.2 cm apart and have an area of 4.4 cm2 then the molar conductivity (in S m^2 $mole^{-1}$) of the solution is

(a) 0.2 (b) 0.02 (c) 0.002 (d) None of these

17. The equilibrium constant for the reaction Sr(s) +Mg^{+2} (aq) → Sr^{+2} (aq) + Mg(s) is 2.69×10^{12} at 25°C.The E^0 for a cell made up of the Sr/Sr^{+2} and Mg^{+2}/Mg half-cells
(a) 0.3667 V (b) 0.7346 V
(c) 0.1836 V (d) 0.1349 V

18. The dissociation constant of n-butyric acid is 1.6×10^{-5} and the molar conductivity at infinite dilution is 380×10^{-4} S m^2 mol^{-1}. The specific conductance of the 0.01 M acid solution is
(a) 1.52 S m^{-1} (b) 1.52×10^{-2} S m^{-1}
(c) 1.52×10^{-3} S m^{-1} (d) None of these

19. The chemical reaction, $2AgCl(s) + H_2(g) \rightarrow 2HCl(aq) + 2Ag(s)$ taking place in a galvanic cell is represented by the notation;

(a) $Pt_{(s)} \mid H_{2(g)}, 1\ bar \mid 1\ M\ KCl_{(aq)} \mid AgCl_{(s)} \mid Ag_{(s)}$

(b) $Pt_{(s)} \mid H_{2(g)}, 1\ bar \mid 1\ M\ HCl_{(aq)} \mid 1M Ag^{+}_{(aq)} \mid Ag_{(s)}$

(c) $Pt_{(s)} \mid H_{2(g)}, 1\ bar \mid 1\ M\ HCl_{(aq)} \mid AgCl_{(s)} \mid Ag_{(s)}$

(d) $Pt_{(s)} \mid H_{2(g)}, 1\ bar \mid 1\ M\ HCl_{(aq)} \mid Ag_{(s)} \mid AgCl_{(s)}$

20. Molar conductances of $BaCl_2$, H_2SO_4 and HCl at infinite dilutions are x_1, x_2 and x_3 respectively. Equivalent conductance of $BaSO_4$ at infinite dilution will be
(a) $(x_1 + x_2 - x_3)/2$ (b) $x_1 + x_2 - 2x_3$
(c) $(x_1 - x_2 - x_3)/2$ (d) $(x_1 + x_2 - 2x_3)/2$

21. The cell constant of a given cell is 0.47 cm^{-1}. The resistance of a solution placed in this cell is measured to be 31.6 ohm. The conductivity of the solution in Scm^{-1}

(a) 0.15 (b) 1.5
(c) 0.015 (d) 150

22. If the pressure of hydrogen gas is increased from 1 arm to 100 atm, keeping the hydrogen ion concentration constant at 1 M, the voltage of the hydrogen half cell at 25°C will be
(a) –0.059 V (b) +0.059 V
(c) 5.09 V (d) 0.259 V

23. The hydrogen electrode is dipped in a solution of pH =3.0 at 25°C. The potential of hydrogen electrode would be
(a) –0.177 V (b) 0.177 V
(c) 1.77 V (d) 0.277 V

24. Given that $E°$ (Zn^{2+}/Zn) = –0.763 V and E° (Cd^{2+}/Cd) = –0.403 V, the emf of the following cell Zn | Zn^{2+} (a = 0.04) || Cd^{2+} (a = 0.2) | Cd is given by
(a) E = +0.36 + [0.059 / 2] [log (0.2/0.004)]
(b) E = – 0.36 + [0.059 / 2] [log (0.2/0.004)]

(c) $E = +0.36 + [0.059 / 2] [\log (0.004/0.2)]$
(d) $E = -0.36 + [0.059 / 2] [\log (0.004/0.2)]$

25. A conductivity cell containing electrodes made up of
(a) Gold
(b) Silver
(c) Platinised platinum
(d) Copper

26. Which of the following statement is correct?
(a) E_{Cell} and $\Delta_r G$ of cell reaction both are extensive properties.
(b) E_{Cell} and $\Delta_r G$ of cell reaction both are . intensive properties.
(c) E_{Cell} is an intensive property while $\Delta_r G$ of cell reaction is an extensive property.
(d) E_{Cell} is an extensive property while $\Delta_r G$ of cell reaction is an intensive property

27. On electrolysis of dilute sulphuric acid using Pt electrodes ,the product obtained at the anode will be
(a)Hydrogen (b)Oxygen
(c)H_2S (d)Sulphur dioxide

28. The conductivity of 0.20 M solution of KCl at 298 K is 0.0248 S cm^{-1}. Its molar conductivity is:
(a) 120 S cm^2 mol^{-1} (b) 115 S cm^2/mol
(c) 124.0 S cm^2 mol^{-1} (d) 1105 cm^2/mol

29. An electrochemical cell stops working after some time because
(a) one of the electrodes is eaten away.
(b) electrode potentials of both the electrodes become equal in magnitude.
(c) electrode potentials of both electrodes go on decreasing.
(d) electrode potentials of both the electrodes go on increasing.

30. A standard hydrogen electrode has zero electrode potential because
(a) hydrogen is easier to oxidise.
(b) this electrode potential is assumed to be zero.
(c) hydrogen atom has only one electron.
(d) hydrogen is the lightest element

A statement of assertion is followed by a statement of reason. Mark the correct choice from the options given below

a) Both assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false.

(d) Both assertion and reason are false

31. Assertion : Kohlrausch law helps to find the molar conductivity of weak electrolyte at infinite dilution.
Reason : Molar conductivity of a weak electrolyte at infinite dilution cannot be determined Experimentally

32. Assertion: For measuring resistance of an ionic solution an AC source is used.
Reason: Concentration of ionic solution will change if DC source is used
Fill in the blanks

33. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called _____.
34. The reaction is spontaneous if the cell potential is_____
35. Λ° for weak electrolyte is determined by _____ .
36. For strong electrolytes, the plot of molar conductance versus $\sqrt{c}$ is_____-
37. The electrode potential becomes equal to standard electrode potential when reactants and products concentration ratio is_____
38. Given
E° ($Cr^{3+/}Cr$)=-0.74V, E° (MnO_4^-/Mn^{2+})=1.51V, E° ($Cr_2O_7^{2-}/Cr^{3+}$)=1.33V, E° (Cl^-/Cl)=1.36V

Based on the above data, the strongest oxidizing agent is _____
39. The pressure of H_2 required to make the potential of H_2-electrode zero in pure water at 298K is

(a)10^{-10}atm (b) 10^{-4}atm (c) 10^{-14}atm (d) 10^{-12}atm
40. Match the following

Column I	Column II
(*a*) Λ_m	(*i*) S cm^{-1}
(*b*) E_{Cell}	(*ii*) m^{-1}
(*c*) κ	(*iii*) S cm^2 mol^{-1}
(*d*) G*	(*iv*) V