

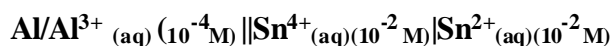


INDIAN SCHOOL MUSCAT
SENIOR SECTION
DEPARTMENT OF CHEMISTRY
CLASS XII
ELECTROCHEMISTRY
Worksheet -6



1. What is meant by limiting molar conductivity?
2. The E° values of Cu and Zn are 0.34V and $-0.76V$ respectively. Which of the two is a stronger reducing agent?
3. Calculate the potential of hydrogen electrode in contact with a solution having pH value 10.
4. How many Faradays are required to produce 2.4g of Mg?
5. How much charge is needed to oxidize one mole of FeO to Fe₂O₃?
6. Write Nerst equation and calculate the emf of following cell at 298 K:
 $Mg(s)|Mg^{2+}(0.001 M)||Cu^{2+}(0.0001 M)|Cu(s)$.Given $E^\circ_{cell} = 2.71 V$.
7. Define and express the relationship between conductivity and molar conductivity for the solution of an electrolyte.
8. Electrolytic specific conductance of 0.25M solution of KCl at 25^oC is $2.56 \times 10^{-2} S/cm$, calculate the molar conductance.
9. Describe the reactions which occur at the electrodes in a fuel cell that causes H₂ and O₂ to produce electricity.
10. How many hours does it take to reduce 3 moles of Fe³⁺ to Fe²⁺ with a current of 2 amperes?
11. Account for the following:
 - a) Alkaline medium inhibits the rusting of iron.
 - b) Iron does not rust even if the zinc coating is broken in a galvanized iron pipe.
12. Calculate the time to deposit 1.5 g of silver at cathode when a current of 1.5 A was passed through the solution of AgNO₃. (Molar mass of Ag = 108 g mol⁻¹, 1 F = 96500 C mol⁻¹)
13. Three electrolytic cells A, B, C containing solutions of ZnSO₄, AgNO₃ and CuSO₄, respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were deposited?
14. Conductivity of 0.00241 M acetic acid is $7.896 \times 10^{-5} S cm^{-1}$. Calculate its molar conductivity and if λ°_m for acetic acid is 390.5 S cm² mol⁻¹, what is its dissociation constant?
15. Calculate the equilibrium constant and ΔG° for the following reaction at 25^oC.
 $Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$,
Given that the cell potential at 25^oC is 1.05V. (1F = 96500 C mol⁻¹)
16. What type of a battery is the lead storage battery? Write the anode and cathode reactions and the overall reaction occurring in a lead storage battery when the cell is in use.

17. A conductivity cell with cell constant 3cm^{-1} is filled with 0.1M acetic acid solution. The resistance is found to be 4000 ohms . Find
- molar conductance of 0.1M acetic acid
 - Degree of dissociation of acetic acid given that $\Lambda^0(\text{CH}_3\text{COOH}) = 400\text{ S cm}^2\text{ mol}^{-1}$.
18. a) State Kohlrausch's law of independent migration of ions. Write an expression for the molar conductivity of acetic acid at infinite dilution according to Kohlrausch's law.
- b) Calculate λ_m^0 for acetic acid.
Given that $\lambda_m^0(\text{HCl}) = 426\text{ Scm}^2\text{mol}^{-1}$ and
 $\lambda_m^0(\text{CH}_3\text{COONa}) = 91\text{ Scm}^2\text{mol}^{-1}$
19. Calculate E_{cell} and ΔG for the following reaction. Given $E^0_{\text{Cell}} = 1.81\text{ V}$



20. Explain the electrochemical theory of rusting.
