

Topic: Electrochemistry

1. Resistance of a conductivity cell filled with 0.1 mol L^{-1} KCl solution is 100Ω . If the resistance of the same cell when filled with 0.02 mol L^{-1} KCl solution is 520Ω . Calculate the conductivity and molar conductivity of 0.02 mol L^{-1} KCl solution. The conductivity of 0.1 mol L^{-1} KCl solution is 1.29 S/m .

2. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

3. Explain how rusting of iron is envisaged as setting up of electrochemical cell.

4. In the button cell widely used in watches and other devices, the following reaction takes place :



Given $E^\ominus_{\text{Ag}/\text{Ag}} = 0.34 \text{ V}$, $E^\ominus_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V}$. Determine $\Delta_r G^\ominus$ and E^\ominus for the reaction.

5. Three electrolytic cells A,B,C containing solution of ZnSO_4 , AgNO_3 and CuSO_4 , 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 of zinc were deposited?

6. Write the name of chemical substance which is used to prevent the corrosion.

7. Why alternating current is used for measuring electrolytic conductivity?

8. State and explain Kohlrausch law of independent migration of ions.

9. What are the fuel cells? Explain the working of $\text{H}_2\text{-O}_2$ fuel cell.

10. CO_2 is always present in natural water. Explain it's effect on rusting of iron.