INDIAN SCHOOL NIZWA - WORKSHEET

CHEMISTRY

CHAPTER: 3 ELECTROCHEMISTRY CLASS:XII

1. Depict the galvanic cell in which the following reaction takes place.
   $Cu(s) + 2\ Ag^{+}(aq) \longrightarrow Cu^{2+}(aq) + 2\ Ag(s)$
2. What does the standard electrode potential of a metal being negative 0.76 V indicate?
3. Name any two materials other than hydrogen that can be used as fuels in fuel cells.
4. Why is equilibrium constant K related to only E^0 cell and not Ecell?
5. Suggest a way to determine the Λ^0_m value of water.
6. Electrolysis of KBr (aq) gives Br_2 at anode but of KF (aq) does not give F_2. Give reason for disparity in behavior.
7. Name any two materials other than hydrogen that can be used as fuels in fuel cells.
8. Name any two metals which can be used for cathodic protection of iron.
9. What type of metals can be used in cathodic protection of iron against rusting?
10. For the cell $Ni/Ni^{2+}(0.01\ M)//Cu^{2+}(0.1M)/Cu$, E_{cell} is 0.59 V calculate $E^0\ Ni^{2+}/Ni$.
11. Calculate the cell potential of the following cell at 25 ^{0}C . $Sn^{4+}(1.5M) + Zn \rightarrow Sn^{2+}(0.5\ M) + Zn^{2+}(2M)$ given $E^0(Sn^{4+}/Sn^{2+}) = -0.154$ V and $E^0\ Zn^{2+}/Zn = -0.76$ V. Will the cell potential increase or decrease if the concentration of Sn^{4+} is increased?
12. Determine the equilibrium constant for the following at 298 K.
    $2\ Fe^{3+} + Sn^{2+} \rightarrow 2Fe^{2+} + Sn^{4+}$ $E^0(Fe^{3+}/Fe^{2+}) = 0.771$ V and $E^0\ Sn^{4+}/Sn^{2+} = 0.154$ V . From the value of Kc predict whether Sn^{2+} can reduce Fe^{3+} to Fe^{2+} quantitatively or not.
13. How many Faradays are required to produce 2.4 g of Mg?
14. How many hours does it take to reduce 3 mols of Fe^{3+} to Fe^{2+} with a current of 2 amps?
15. If specific conductance of 0.25M KCl at 25 ^{0} C is 2.56 x 10^{-2}S/cm, find Λ_m.
16. What mass of aluminium (III) ion will be reduced by 1 mole of electrons?
17. A voltaic cell is set up at 25 ^{0} C with the following half cells:
    $Al/Al^{3+}(0.0010M)$ and $Ni/Ni^{2+}(0.50\ M)$
    Given $E^0\ Ni^{2+}/Ni = 0.25$ V, $E^0\ Al^{3+}/Al = -1.66$ V
    Write the Nernst equation for the cell reaction that occurs when the cell generates an electric current and determine the cell potential
18. An aqueous solution of copper sulphate , $CuSO_4$ was electrolysed between platinum electrodes using a current of 0.1287 ampere for 50 minutes. [At mass of Cu = 63.5 g mol-1]
    a) Write the cathodic reaction

b) Calculate i) Electric charge passed during electrolysis
ii) Mass of copper deposited at the cathode
[Given 1F = 965000 C mol^{-1}]

19. How do fuel cells resemble and differ from galvanic cell?

20. Calculate $\Lambda^0 m$ for acetic acid, given that

$\Lambda^0 m(HCl) = 426\ S\ cm^2\ mol^{-1}$

$\Lambda^0 m(NaCl) = 126\ S\ cm^2 mol\text{-}1$

$\Lambda^0 m(CH_3COONa) = 91\ S\ cm^2 mol\text{-}1$