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Guess Paper – 2014
Class – XII
Subject – Chemistry

Electrochemistry

1. Calculate the molar conductance for NH_4OH at infinite dilution if the molar conductances at infinite dilution for $Ba(OH)_2$, $BaCl_2$ and NH_4Cl are 523.28, 280 and 129.8 $ohm^{-1}\ cm^2\ mol^{-1}$ respectively.
2. Calculate the equilibrium constant of the reaction at 298 K

$$2Fe^{3+} + Sn^{2+} \rightleftharpoons 2Fe^{2+} + Sn^{4+}$$

Given $E^\circ_{Fe^{3+}/Fe^{2+}} = 0.77$ V, $E^\circ_{Sn^{4+}/Sn^{2+}} = 0.15$ VR = 8.314 J K^{-1} mol^{-1} F = 96500 C mol^{-1}.

3. Calculate the equivalent conductance of 1 M H_2SO_4 solution of its conductivity is 2.6×10^{-2} $ohm^{-1}\ cm^{-1}$.
4. The resistance of 0.01 M NaCl solution is 200 Ω at 25°C. Cell constant of the conductivity cell is unity. Calculate Λ_m of the solution.
5. Calculate the equilibrium constant for the reaction

$$Fe^{2+} + Cr^{4+} \longrightarrow Fe^{3+} + Cr^{3+}$$

Given $E^\circ_{Cr^{4+}/Cr^{3+}} = 1.44$V, $E^\circ_{Fe^{3+}/Fe^{2+}} = 0.680$

6. Calculate the standard reduction electrode potential of Ag^+/Ag electrode. When the cell potential, E°, for the cell,

$Cu(s) \mid Cu^{2+}(aq)\ (1\ M) \parallel Ag^+(aq)\ (1\ M) \mid Ag(s)$ is + 0.46 volt, $E^\circ_{Cu^{2+}/Cu} = 0.34$ V.

7. Calculate the molar conductivity at infinite dilution (Λ°_m) for NH_4OH from the following data. Λ°_m for NH_4Cl, NaOH, and NaCl at infinite dilution are 129.8, 248.1, and 126.45 S $cm^2\ mol^{-1}$.
8. The half reactions are

(*i*) $Fe^{3+} + e^- \longrightarrow Fe^{2+}$ $E^\circ = 0.76$ V

(*ii*) $Ag^+ + e^- \longrightarrow Ag$ $E^\circ = 0.8$ V

Calculate K_C for the following reaction at 25° C.

$Ag^+ + Fe^{2+} \longrightarrow Fe^{3+} + Ag$ (F = 96500 C mol^{-1})

9. Write the Nernst equation and calculate the e.m.f. of the following cell at 298 K

$Cu(s) \mid Cu^{2+}(0.13\ M) \parallel Ag^+\ (1 \times 10^{-4}\ M) \mid Ag(s)$

Given $E^\circ_{Cu^{2+}/Cu} = 0.34$ V, $E^\circ_{Ag^{+1}/Ag} = 0.80$ V

10. Calculate the cell e.m.f. at 25°C for the following cell :

$Mg(s) \mid Mg^{2+}\ (0.01\ M) \parallel Sn^{2+}\ (0.1\ M) \mid Sn(s)$

Given $E^\circ_{Mg^{2+}/Mg} = -2.34$ V, $E^\circ_{Sn^{2+}/Sn} = -0.136$ V F = 96500 C mol^{-1}

Calculate the maximum work than can be accomplished by the operation of this cell.

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EQUILIBRIUM CLASSES

PRACTICE PROBLEMS TOPIC – ELECTROCHEMISTRY

Attempt all questions.

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