3/6/24

DOON UNIVERSITY, DEHRADUN
End Semester Examination, Semester 4th
Academic Year 2023-24(Even Semester)
School of Physical Sciences
Department Name- Chemistry
Programme Name- B.Sc H Chemistry
Course Code with Title – CYC-253 Elecrochemistry

Time Allowed 2 Hours ***Maximum Marks: 30***

SECTION: A

(Objective Type Questions) **1x10=10 marks**

1. When electricity is passed through a solution of $AlCl_3$, 13.5 gram of Al is deposited. The no of Faraday must be:
   a. 1 b. 1.5 c. 0.5 d. 2
   b.
2. E^0 for $F_2 + 2e^-$ is 2.8V, E^0 for $\frac{1}{2} F_2 + e^- = F^-$ is
   a. 2.8 b. 1.4 c. -2.8 d. -1.4
   b.
3. Debye- Huckel theory is applicable to :
   a. CH_3COOH b. KCN c. NH_4OH d. KNO_3
   b.
4. The unit of equivalent conductivity is:
   a. $Ohm^{-1}\ cm^{-1}$ b. $Ohm^{-1}\ cm^2\ eq$ c. $Ohm^{-1}\ cm^2 eq^{-1}$
   d. $Ohm^{-1}\ cm^2 eq^{-1}$
5. The conductivity of a solution depends on:

a. Number of ions b. Number of molecules c. Number of particles
d. all

6. If the degree of ionisation of N/10 acetic acid is 10%, its ionisation constant is:

a. 10^{-1} b. 10^{-2} c. 10^{-3} d. 10^{-4}

SECTION: B

(Short Answer Type Questions) **(2x7=14).**

1. Define electrolysis, also explain faraday's law of electrolysis.
2. Explain Hittorf's methods of discharge of ions on electrolysis.
3. Write two applications of Kohlrausch's law, with examples.
4. What are concentration cell? Explain electrode concentration cell.
5. What is a Nernst's equation. Derive expression to calculate emf (reduction) of the following half cell at 25°c.
   i. $Fe^{3+}/Fe^{2+}(Pt)$ ii. $Cl_2(g)$ 1 atm/ $2Cl^-$ (Pt).
6. Explain reference electrode i.e primary and secondary reference electrode.
7. Write the concept of reversible and irreversible cell.

SECTION: C 2x5=10

(Long answer type question)

1. Define e.m.f, derive the relationship between emf and thermodynamic quantities ΔG, ΔH and ΔS.
2. What are electrolytic cells, explain electrolytic cell with transference and without transference.