

2022

Time - 3 hours

Full Marks - 60

*Answer all groups as per instructions.
Figures in the right hand margin indicate marks.
Candidates are required to answer
in their own words as far as practicable.*

GROUP – A

1. Answer all questions and fill in blanks as required. [1 × 8]
- (a) Molten sodium chloride conducts electricity due to the presence of _____.
- (b) The correct order of equivalent conductance of infinite dilution of LiCl, NaCl and KCl is _____.
- (c) The units of specific conductance is _____.
- (d) Transport number of Cl^- ion in NaCl solution is _____ than that in HCl solution.
- (e) Oxidation potential of an electrode is _____ to concentration of ions.
- (f) The emf measurement can be used to determine _____.

P.T.O.

[2]

- (g) The net charge of a dipole is _____.
- (h) How activity and concentration are related ?

GROUP – B

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) Why does equivalent conductance of a solution is constant at infinite dilution ?
- (b) What is the effect of dilution on the specific conductance of a solution ?
- (c) What do you mean by conductometry titration ?
- (d) Define the transport number.
- (e) What is ionic mobility ?
- (f) Why fluorine cannot be prepared from fluorides by chemical oxidation ?
- (g) What is electrode potential ?
- (h) Write the conventional representation of a Galvanic cell.
- (i) Write the expression for activity of AlCl_3 in terms of molality(m) and mean activity coefficient (γ_{\pm}).
- (j) What do you mean by paramagnetic and diamagnetic substances ?

[3]

GROUP – C

3. Answer any eight of the following questions within 75 words each.

[2 × 8

- (a) What is Kohlrausch's law ?
- (b) The ionic conductance at infinite dilution of silver ions is 61.92 ohm⁻¹ at 298 K. Calculate the ionic mobility of silver ions at 298 K.
- (c) What is Wien effect ?
- (d) What do you understand by electrophoretic effect ?
- (e) Write the difference between solubility and solubility product.
- (f) A molar solution of ethanoic acid conducts electricity but not so easily as molar solution of hydrochloric acid. Explain.
- (g) What is the difference between EMF and potential difference ?
- (h) Write the difference between electrochemical cell and electrolytic cell.
- (i) Calculate the number of coulombs required to deposit 6.75 g of Al when the electrode reaction is –



(Atomic mass of Al = 27 g.mol⁻¹, F = 96500 c.mol⁻¹)

- (j) What are concentration cells ? Give examples.

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[4]

GROUP – D

Answer any four questions within 500 words each.

4. Describe Onsager equation as applicable to strong electrolytes. Discuss its significance. [6]
5. Explain Kohlrausch's law of independent migration of ions. Write its applications. [6]
6. Describe Hittorf's method of determination of transport number. [6]
7. Describe various types of titrations involved in conductometric titration. [6]
8. Describe standard hydrogen electrode. Explain the effect of electrolyte concentration on electrode potential. [6]
9. What is a reversible electrochemical cell ? Discuss the method of finding its emf with suitable examples. [6]
10. What are concentration cells ? Derive an expression for the EMF of a concentration cell with transference. [6]
11. What is liquid junction potential ? Derive an expression for it. [6]