



DJ-003-001608

Seat No. _____

B. Sc. (Sem. VI) (CBCS) (W.E.F. 2012) Examination

March - 2022

C-603 : Physical Chemistry & Analytical Chemistry
(Old Course)

Faculty Code : 003

Subject Code : 001608

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :**
- (1) All questions are compulsory.
 - (2) Question-1 contains 20 short questions of one mark each.
 - (3) Questions 2 and 3 carries 25 marks.

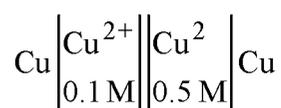
1 Answer the following questions : 20

- (1) Write any one statement of 3rd law of thermodynamics.
- (2) Define : Partial molar property.
- (3) Write Mathematical form of Debye-Huckel limiting law.
- (4) In equation $a = f.c.$, f is the _____.
- (5) Give an example of electrode concentration cell.
- (6) Define : Concentration cell.
- (7) Calculate ionic strength (μ) of 0.001 m KCl solution.
- (8) Name any one application of emf measurement.
- (9) Give Mathematical formula of Nernst distribution law.
- (10) What is entropy ?
- (11) The unit of conductivity of solution is _____.
- (12) Define conductance.
- (13) Define Mobile phase.
- (14) What is the formula of R_f value ?
- (15) Define Partition chromatography.

- (16) Write structural formula of EDTA.
- (17) ppm means _____
- (18) Write the principle of potentiometric method.
- (19) Define pH.
- (20) What is Conductivity water ?

2 (a) Answer any three questions : 6

- (1) Give any one test of 3rd law of thermodynamics.
- (2) Explain LJP.
- (3) Why does E_{cell}° (standard cell potential) for concentration cell is zero ?
- (4) Explain effect of pressure on chemical potential.
- (5) Derive mean activity for AB type of salt.
- (6) Determine the emf of given cell at 25°C temperature. ($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)



(b) Answer any three questions : 9

- (1) Give a note on Residual entropy.
- (2) Give characteristics of chemical potential.
- (3) How ionic product of water (K_w) can obtain by help of EMF measurement ?
- (4) Derive equation of pH by Calomel electrode.
- (5) What is average activity and average activity coefficient ?
- (6) If 4 gms of NaOH in 1 litre of its solution. Calculate ionic strength (μ) of solution.

(c) Answer any two questions : 10

- (1) Explain the determination of absolute entropy for solid, liquid and gas with related equations.
- (2) Derive Nernst Heat theorem. How does it lead to third law of thermodynamics ?
- (3) Derive Gibbs-Duhem equation.
- (4) Derive equation of EMF of concentration cell with transference.
- (5) Discuss solubility method for determination of activity coefficient.

3 (a) Answer any three questions : 6

- (1) Explain the platization of platinum electrode of conductivity cell.
- (2) Explain cell constant of conductivity cell.
- (3) Give classification of chromatography.
- (4) Give the factors affecting on the Rf value in chromatography.
- (5) Discuss the preparation of standard EDTA solution.
- (6) Draw only potentiometric titration curve of monobasic strong acid → strong base.

(b) Answer any three questions : 9

- (1) Discuss Kohlrausch law.
- (2) Explain the conductometric titration of strong acid against strong base.
- (3) Explain the selection of carrier gas for gas chromatography.
- (4) Give uses of column chromatography.
- (5) Write a note on Eriochrome-Black-T.
- (6) Which type of care should be taken in conductometric titration ?

(c) Answer any two questions :

10

- (1) Explain the method to determine solubility and solubility product of sparingly soluble salt by conductometry measurement.
 - (2) Describe precipitation titration by conductometry.
 - (3) Explain Gas Liquid chromatography.
 - (4) Discuss : Types of EDTA titrations.
 - (5) What is redox titration ? Discuss redox titration of $\text{FeSO}_4 \rightarrow \text{K}_2\text{Cr}_2\text{O}_7$ by potentiometry.
-