



HAF-003-001608

Seat No. _____

B. Sc. (Sem. VI) (CBCS) Examination

June / July - 2017

Chemistry - 603

(Physical Chemistry & Analytical Chemistry)

Faculty Code : 003

Subject Code : 001608

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

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) Question-1 includes 20 marks.
(3) Question-2 and 3 includes 25 marks each.

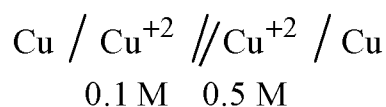
1 Answer the following : 20

- (1) Write down the statements of Richard, Nernst and Max plank.
- (2) What is entropy ?
- (3) Give the statement of Nernst distribution law.
- (4) Decrease in vapour pressure is equal to mole fraction of solute has been known as _____ law.
- (5) Define : Chemical potential.
- (6) In equation $a = f c$, f is the _____
- (7) The activity has been indicated for ideal gas by _____
- (8) What is electromotive force ?
- (9) Define : Concentration cell.
- (10) The cell reaction has reached equilibrium, the voltage(E°) has dropped to _____
- (11) Define : Equivalent conductance.
- (12) What is platinization of electrode ?
- (13) Define : Partition chromatography.
- (14) In adsorption chromatography, stationary phase is _____

- (15) Explain effect of solvent's viscosity used in chromatography.
- (16) Titration reaction between metal ion and EDTA should be _____, so calculation can be done easily.
- (17) Define: Masking agent.
- (18) $C_8H_4O_6N_5$ is the molecular formula of _____ as metal ion indicator.
- (19) Give the principle of potentiometric method.
- (20) pH scale is arranged between _____.

2 (a) Answer the following : (any **three**) 6

- (1) Explain the final statement of Nernst in reference of the third law of thermodynamics.
- (2) Explain partial molar properties in short.
- (3) Give the statement of Henry's law and write its final equation only.
- (4) Define :
 - (i) Activity
 - (ii) Activity co-efficient.
- (5) Write down advantages of glass electrode.
- (6) Determine the emf of given cell at 25°C.
($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

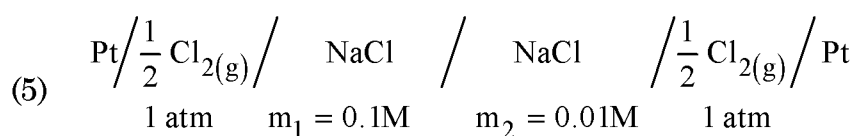


(b) Answer the following : (any **three**) 9

- (1) Derive the mathematical form of the third law of thermodynamics.
- (2) Give a note on Residual entropy.
- (3) Explain effect of pressure on chemical potential.
- (4) Discuss Ionic strength and give calculation for any one proper example.
- (5) Explain Liquid Junction Potential.
- (6) Find out μ , γ_+ , γ_- for solution of 0.005 BaCl_2 .

(c) Answer the following : (any **two**) 10

- (1) Explain the determination of absolute entropies for solid, liquid and gas with related equations respectively.
- (2) Derive Gibbs-Duhem, equation in reference of chemical potential.
- (3) Write down method to determine activity co-efficient by solubility method.
- (4) Explain determination of ionic product of water by emf measurement.



For given cell calculate (i) emf without LJP
(ii) emf with LJP (iii) only LJP at 25°C. ($t_+ = 0.39$,
 $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

3 (a) Answer the following : (any **three**) 6

- (1) Which type of care should be taken in conductometric titration?
- (2) Define : (i) Mobile phase (ii) Stationary phase.
- (3) Give the factors affecting on the R_f value in chromatography.
- (4) Discuss the preparation of standard EDTA solution in short.
- (5) Explain principle of redox titration.
- (6) Explain Henderson equation to calculate the dissociation constant of weak acid.

(b) Answer the following : (any **three**) **9**

- (1) Explain resistance and specific resistance for conductometry.
- (2) Discuss Kohlrausch's law.
- (3) Give the uses of column chromatography.
- (4) Give the separation of ions for Lanthanide elements in Ion exchange chromatography.
- (5) Write a note on Eriochrom Black-T.
- (6) 0.05M NH_4OH solution has pH^{11} at 25°C . Calculate the degree of dissociation.

(c) Answer the following : (any **two**) **10**

- (1) Explain the method to determine solubility and solubility product of sparingly salt by conductance measurement.
 - (2) What is Paper chromatography ? Explain Ascending paper chromatography.
 - (3) Explain Gas Liquid Chromatography (GLC).
 - (4) Discuss the types of EDTA titrations.
 - (5) Explain acid-base potentiometric titration with related examples.
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