PB-003-001608 Seat No. _____

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

March / April - 2020

Chemistry : C-603

(Physical Chemistry & Analytical Chemistry)

(Old Course)

Faculty Code : 003

Subject Code : 001608

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Answer following questions : **20**

(1) What is mathematical form of Debye Huckel limiting law ?

(2) What is mathematical form of Nernst heat theorem ?

(3) Give Gibbs Helmoholz equation.

(4) Define open system.

(5) Write mathematical form of "Nernst's Distribution" law.

(6) Define partial molar entropy.

(7) Give reduction half cell reaction on chlorine gas electrode.

(8) Give an example of electrode concentration cell.

(9) What is ionic product of water at 25°C ?

(10) Define pH.

(11) Define "equivalent conductance."

(12) Draw the nature of the conductometry titration of "weak acid versus strong base".

(13) In thin layer chromatography stationary phase usually made up of (i) _____ and (ii) _____.

(14) Best TLC plate can be prepared by _____ method.

(15) Which type of chromatography is useful for the purpose of "water softening" ?

(16) EDTA is which type of legend ?

(17) What is role of masking agent ?

(18) Which colour gives phenolphthalein in 0.5 M HCl solution ?

(19) Define argentometry titration.

(20) Draw the schematic graph of pH metry titration of "strong acid versus strong base."

2 (a) Answer any **3** questions. **6**

(1) Calculate valence factor of Na_2SO_4.

(2) List any four applications of emf measurements.

(3) Give any one test of 3rd law of thermodynamics.

(4) Why does ΔE^{o}_{cell} for concentration cells is zero ?

(5) What is importance of "partial molar property" concept ?

(6) What is relationship between activity and activity coefficient for uni-univalent electrolyte ?

(b) Answer any **3** questions : **9**

(1) Derive the equation to calculate ΔE_{cell}, of concentration cell without LJP and with transference.

(2) Discuss the effect of temperature on chemical potential.

(3) How 'Nernst Heat Theorem' leads to the 3rd law of thermodynamics ?

(4) Give characteristics of chemical potential.

(5) If 4 gram of NaOH in 1 litre of its solution, calculate ionic strength of solution.

(6) Derive equation of pH by calomel electrode.

(c) Answer any **2** questions : **10**

(1) Discuss the determination of absolute entropies of solid, liquid and gas with related equations.

(2) Write a short note on LJP. Explain "how can reduce or eliminate LJP" ?

(3) Discuss the method of intercept to determine partial molar property.

(4) Discuss any one "emf method" to determine activity coefficient.

(5) Discuss the emf method to determine dissociation constant of weak acid.

3 (a) Answer any **three** questions : 6

(1) Give schematic classification of chromatography.

(2) Define : Rf-value and Rx-value.

(3) Give Kohlrauch law.

(4) Which factors affecting conductance ?

(5) Give Welcher's rule for EDTA titration.

(6) Define :

(a) Ohm's law

(b) Ligand

(b) Answer any **three** questions : 9

(1) Give uses of ion exchange chromatography.

(2) Compare advantages of TLC with other chromatographic techniques.

(3) Explain the principle of metal ion indicator.

(4) Define : conductivity water. How it can prepare ?

(5) Explain potentiometry titration of "mixture of Cl^-, Br^-, I^- versus $AgNO_3$".

(6) Derive Handerson equation to determine dissociation constant of weak acid by pH-metry.

(c) Answer any **two** questions : **10**

(1) Define all types of EDTA titrations.

(2) Explain following conductometry titrations.

(a) Strong acid v/s weak base

(b) Weak acid v/s strong base

(3) Explain "Fe versus $Ce(SO_4)_2$" redox titration by potentiometry.

(4) Discuss paper chromatography in detail.

(5) Explain cation and anion exchange resin.
