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

July – 2021

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)Figures on right hand side indicates marks.

1. Answer the following question: 20

(1) The third law of thermodynamics can be tested by comparing ΔS at transition temperature of _____

(2) What is   determined by the graph of Cp vs ln T ?

(3) Give formulla for activity co officient.

(4) Who introduced the concept of partial molar property?

(5) Which laws can be derived by chemical potential?

(6) What is used in salt bridge?

(7) The cell $Pt/H_{2(g)(1atm)}.KOH_{(0.01N)} \mid \mid HCl_{(0.01N)}, H_{2(g)(1atm)}/Pt$ is used to measure -----

(8) For the cell, $Pt/H_{2(g)(P_1 atm)} \mid HCL_{(0.1M)}, \mid H_{2(g)(P_2 atm)}/Pt$ the EMF of cell is positive if---- (a)P_1<P_2 (b)P_1>P_2 (c)P_1=P_2 (d)none

(9) Give relationship between activity a_2 of AgCl solution and its mean activity .

(10) What is the ionic strength of 0.01 M KCl solution?

(11) What is unit of specific conductance?

(12) Give formula for cell constant.

(13) What is the effect of dilution on specific conductance.

(14) Who separated the extraction of green leaves by chromatography?

(15) Give name of visulizing agent for metal ion in chromatography.

(16) Which gas mostly used as carrier gas in gas chromatography?

(17) Give formula for P^H.

(18) Give any two name of metal ion indicator?

(19) In case of titration of mixture of Pb^{+2} and Ni^{+2} by EDTA, _____ is used as masking agent

(20) Give name of Primary reference electrode.

2. (a) Answer any three question: 6

(1) Write the statement of third law of thermodynamics.

(2) Define: Open system, Intensive property.

(3) Write the cell reaction of the cell $Hg - Pb_{(c_1)} | PbSO_{4(ag)} | Hg - Pb_{(c_2)}$

(4) Derive $a_2 = a_+^{v+} a_-^{v-}$ for AB_2 type salt.

(5) Represent the electrolyte concentration cell without transference.

(6) Find μ(ionic strength) of 0.01 M K_2SO_4 solution.

(b) Answer any three question: 9

(1) Explain determination of entropy of solid,liquid and gas.

(2) Derive Raoult's law by chemical potential.

(3) Explain the determination of vacancy of metal ion by E.M.F. method.

(4) Describe the E.M.F. method for determination of solubility of sparingly soluble salt by E.M.F. method.

(5) Define ionic strength and write the factors which affect ionic strength

(6) Explain the graph of $f_\pm \rightarrow \sqrt{\mu}$.

(c) Answer any two questions: 10

(1) Describe the Nernst's heat theorem.

(2) Explain the variation of chemical potential with temperature and pressure.

(3) Derive equation of E.M.F. of concentration cell with transference.

(4) Describe the determination of dissociation constant of weak acid by E.M.F. method.

(5) Explaine: Determination of activity co-efficient by solubility method in detail.

3. (a) Answer any three question: 6

(1) Explain the platinization of platinum electrode of conductivity cell.

(2) Explain: Minima may be observed in case of titration of CH_3COOH against NaOH by conductometry.

(3) Write the principle of ion exchange chromatography.

(4) Name any two methods to prepare a plate of TLC.

(5) Explain Welcher Rule for EDTA titration.

(6) Name any two types of potentiometric titration.

(b) Answer any three question: 9

(1) Explain the conductometric titration of strong acid against strong base.

(2) Specific conductivity of 60gm acetic acid solution in 1000 litre is 4.1×10^{-5} mho at 18°C temperature. The conductivity of H^+ ion and CH3COO- ion is 315 and 35 respectively. Calculate degree of dissociation.

(3) Explain the selection of carrier of gas for gas chromatography

(4) Explain the principle of metal ion indicator.

(5) Describe the separation of lanthanide ions by ion exchange Chromatography.

(6) Write the advantages of glass electrode.

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

    (1) Describe displacement titration by conductometry.

    (2) Describe precipitation titration by conductometry.

    (3) Discuss different type of paper chromatography.

    (4) Describe the various types of EDTA titration.

    (5) Explain pH metry method determine dissociation constant of weak electrolyte.

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