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DR-003-2016008 Seat No. _____

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

April - 2022

C-603 : Chemistry

(Physical & Analytical Chemistry)

(New Course)

Faculty Code : 003

Subject Code : 2016008

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

Instructions : (1) There are five questions.

(2) In each question subquestion **(a) of 4** marks, all are compulsory.

(3) While subquestion **(b), (c), (d)** each with internal options.

(4) Figures to the right indicate full marks.

1 (A) Answer the following questions : **4**

(1) The third law of thermodynamics apply to _____ substances.

(2) The activity has been indicated for ideal gas by _____.

(3) Define : Activity Co-efficient.

(4) For third law of thermodynamics $\lim_{T \to 0} \Delta S =$ _____

(B) Answer any one in brief of following : **2**

(1) Calculate ionic strength of 0.001M k_2SO_4 solution.

(2) Explain Nernst heat theorem.

(C) Answer any one in detail of following : **3**

(1) Derive the mathematical form of third law of thermodynamics.

(2) Write a note on Residual Entropy.

(D) Answer any one of following : **5**

(1) Discuss the determination of absolute entrophy of Solid, Liquid and gas with related equation.

(2) Discuss EMF method for determination of activity Co-efficient.

2 (A) Answer the following question : **4**

(1) What is the value of Ecell at equilibrium state ?

(2) The Salt bridge in the electro chemical cell serves to _____.

(3) The emf, equation to calculate ΔG^0 is _____.

(4) What is the standard cell potential of Concentration cell ?

(B) Answer any one in brief of following : **2**

(1) Define : (a) Sparingly soluble salt.

(b) Salt-bridge

(2) Write short note on Liquid Junction Petential.

(C) Answer any one in detail of following : **3**

(1) Derive the equation of emf for gas concentration cell.

(2) Explain EMF method for the determination of transport number.

(D) Answer any one of following : **5**

(1) Derive an equation of EMF fora concentration cell with transference with LJP.

(2) Explain determination of ionic product of water by EMF measurement.

3 (A) Answer the following questions : **4**

(1) Partial molar property applicable to _____system.

(2) _____error is the most serious error.

(3) Define : Deviation.

(4) Chemical potential depends on which factors ?

(B) Answer any one in brief of following : **2**

(1) Explain accuracy with suitable example.

(2) Describe Henry's law with it's equation.

(C) Answer any one in detail of following : **3**

(1) Explain Q-test with example.

(2) Derive Gibbs -Duhem equation.

(D) Answer any one of following : **5**

(1) Explain method for minimization of errors.

(2) Explain intercept method for the determination of partial molar properties.

4 (A) Answer the following questions : **4**

(1) For paper chromatography stationary phase is _____

(2) Which chromatography is used for softening of water ?

(3) Define : R_f value

(4) Define : stationary phase

(B) Answer any one in brief of following : **2**

(1) TLC is superior than paper chromatography, why ?

(2) Give classification of chromatography.

(C) Answer any one in detail of following : **3**

(1) Explain characteristics selection of adsorbent.

(2) Write note on two dimensional paper chromatography.

(D) Answer any one of following : **5**

(1) Write note on adsorption column chromatography.

(2) Explain in detail GLC Technique.

5 (A) Answer the following questions : **4**

(1) Why saturated calomel electrode is more useful ?

(2) Which gas gives blue colour with startch paper_____.

(3) Which electrode is used as indicator electrode in pH metry titration ?

(4) Give chemical formula of magnesia mixture.

(B) Answer any one in brief of following : **2**

(1) Explain "common effect" in short.

(2) Explain principle of potentiometry method.

(C) Answer any one in detail of following : **3**

(1) Explain separation of Co_3^{-2}, So_3^{-2} and S^{-2} in qualitative analysis.

(2) Explain $FeSo_4 \rightarrow KM_nO_4$ redox titration by potentiometry.

(D) Answer any on of following : **5**

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

(2) Discuss the Argentometric titration by Potentiometry.
