DR-003-1016008 Seat No. _____

B. Sc. (Sem. VI) (CBCS) (W.E.F. 2016) Examination

April - 2022

Chemistry : Paper - C - 603

(Physical & Analytical Chemistry 2018)

Faculty Code : 003

Subject Code : 1016008

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

Instructions : (1) Question paper contains five questions. All are compulsory.

(2) All questions carry equal weightage.

(3) Figures to the right side indicate marks of the question.

1 (a) Answer the following : **4**

(1) Give equation for ionic strength.

(2) Define Activity Co- efficient.

(3) Write the final equation of Henry's law ?

(4) Define Residual Entropy.

(b) Answer any **one** of the following : **2**

(1) Write the equation for Mean Activity and Mean Activity Coefficient.

(2) Give Lewis Randal statement for third law of thermodynamics.

(c) Answer any **one** of the following : **3**

(1) Ionisation of 0.02 M $AgNO_3$ is 80% Calculate.

(2) Explain Nernst theorem.

(d) Answer any **one** of the following : **5**

(1) Explain tests of third law of thermodynamics.

(2) Explain the method to determine Activity Coefficient by EMF Method.

2 (a) Answer the following : **4**

(1) Define reversible cell.

(2) Give example of electrode concentration cell.

(3) How L.J.P. could be Eliminated ?

(4) Write the oxidation reaction of Quinhydrone Electrode.

(b) Answer any **one** of the following : **2**

(1) What are advantages of Glass Electrode ?

(2) Write advantages and disadvantages of Quinhydrone Electrode.

(c) Answer any **one** of the following : **3**

(1) Explain determination of Transport number of Ions by EMF measurement.

(2) Find the EMF of given cell at 25°C and Calculate free energy change :
Cu/Cu^{+2} 0.1M // Cu^{+2} 0.5M / Cu ($R = 8.314\ JK^{-1}\ mol^{-1}$) 4.184 joule = 1 calorie

(d) Answer any **one** of the following : **5**

(1) Derive the equation for pH by Quinhydrone electrode give its advantages and disadvantages.

(2) Explain Deterinination of Dissociation constant of Weak Acid by EMF measurement.

3 (a) Answer the following : **4**

(1) Define Partial Molar Properties.

(2) Give the equation for Raoults law.

(3) Define term precision.

(4) Define term accuracy.

(b) Answer any **one** of the following : **2**

(1) Define the Chemical Potential and Give the factors Effecting.

(2) What is Error ? Define and give example of Indeterminate error.

(c) Answer any **one** of the following : **3**

(1) Explain Determination of Partial Molar Properties by method of Intercept.

(2) Differentiate between Accuracy and Precision.

(d) Answer any **one** of the following : **5**

(1) Explain Determination of Partial Molar Properties by method of Intercept.

(2) Explain Q Test and T test. What is use of it ?

4 (a) Answer the following : 4

(1) Define term Chromatography.

(2) Give one example of Partition Chromatography.

(3) Define Stationary Phase.

(4) Name the molecules used in Polymerization for forming Cation Exchange Resin.

(b) Answer any **one** of the following : 2

(1) Name Mobile Phase used in GLC.

(2) Name different methods could be used for Separation of Amino Acids.

(c) Answer any **one** of the following : 3

(1) Define the terms Retention Factor : Developer; Effluent.

(2) What do you mean by Streaking Method and Fluorescence Method.

(d) Answer any **one** of the following : 5

(1) Explain different types of Paper Chromatography.

(2) Explain Gas Chromatography in details along with factor effecting and few uses of it.

5 (a) Answer the following : 4

(1) Which compound is used for detection of I^- from Cl^- and Br^-.

(2) Cu and Cd could be separated based on what Principle ?

(3) What is use of Potentiometer ?

(4) Define pH of the solution.

(b) Answer any **one** of the following : 2

(1) Explain Importance of Indicator and reference electrode in Potentiometry.

(2) What is Buffer solution give example of it ?

(c) Answer any **one** of the following : 3

(1) How Cl^-, Br^-, I^- could be separated from mixture with help of Copper Sulphate.

(2) Explain Colorimetric method for determining pH of the solution with example.

(d) Answer any **one** of the following : 5

(1) Explain separation of Sulphite, Sulphite and Sulphate as well as Cu^{+2} with Cd^{+2}.

(2) Explain Redox titration between Ferrous Sulphate and Cerium Sulphate in detail.