647510 **BSCphyCC5030** **Seat No :_____**

B.Sc. Semester - 5 (Remedial) (*CBCS*) Examination
Feb/Mar. -2021 (OLD COURSE)
PHYSICAL AND ANALYTICAL CHEMISTRY(CORE)

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1(A) Answer the following question (04)

1. Give the definition of entropy. Explain: Entropy change in reversible process is Zero.

Q.1(B) Answer any two questions (out of three) (10)

1. Derive equations for Entropy change in an. Ideal gas at different conditions.
2. Explain carnot Cycle with its processes in detail.
3. One mole of an ideal gas expan 10 liter to 20 Liter at 298 K. reversibly. Due to this temperature become 250 K. calculate the entropy Change during process. ($C_v = \frac{3}{2} R$)

Q.2(A) Answer the following question. (04)

1. Draw and Explain phase diagram of three pair of partially miscible liquid.

Q.2(B) Answer any two questions (out of three) (10)

1. Derive Clausius Clapeyron equation and its integration form.
2. Explain and derive vant Hoft Isotherm equation.
3. One mole of an ideal gas in 22.4 Lit. is expanded isothermally reversible way at 300 K. to a volume of 224 Lit. And Pressure is 10 to 1 atmosphere. Calculate;

   (i) W (ii) G (iii) ΔM (iv) ΔG (v) ΔS for the gas.

Q.3(A) Answer the following question. (04)

1. Explain spectro photometric estimation with graph and proper explanation.

Q.3(B) Answer the following question (out of three) (10)

1. Explain Calomel Electrode with Figure.
2. Derive the Nernst equation for the Calculation of Single electrode potential.
3. Example:

   Chemical Cell $Zn / Zn^{+2}(0.1M) // Fe^{+2} (0.1M) / Fe$

   Where E $Zn / Zn^{+2} = 0.76$ volt

   $E° Fe^{+2} / Fe = 0.44$ volt

   Give the chemical reaction for above Cell. Calculate the cell potential ΔE and ΔG for given cell at 25° C.

   (R= 8.314 Jule, F= 96500 culoms)

Q.4(A) Answer the following question. (04)

1. Explain titration of strong acid and Weak acid mixture with strong base with graph.

Q.4(B) Answer the following question (out of three) (10)

1. (i) Give Principle of metal ion indicator.
   (ii) write short note on EBT indicator.
2. Discuss the Shape of the replacement titration curve of following.
   (i) Titration of CH_3COONa with HCl
   (ii) Titration of NH_4Cl with NaOH
3. The specific conductance of an aqueous solution of 0.1 M KCI is 1.289 ohm^{-1} mts^{-1} at 25°C. If the area and the distance between the electrodes of the conductance cell are 2.037 cm^2 and 0.531 cm. respectively.
   Calculate the Conductance and resistance of the cell.

Q.5A) Answer the following question. (04)

1. Calculate the Normality of 1000 ml solution prepared from 10.6 gram Na_2CO_3. If 200 ml of the solution is taken from the above Solution and its volume is diluted up to 500 ml. Than Calculate normality of 500 ml of diluted solution.

Q.5(B) Answer the following question (out of three) (10)

1. What is Precipitation titration. Explain In detail Mohr`s Method.
2. (i) Explain Principle of Ostwald`s indicator.
   (ii) Explain Preparation of standard $Na_2S_2O_3$ solution.
3. How many grams $KMnO_4$ required to prepare 0.05N, 500 ml $KMnO_4$ solution is required to prepare 0.03N, 500 ml Solution (K= 39,Mn=55, O=16)

****