

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2024 (NEW COURSE)
Physical and Analytical Chemistry(Core)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

- Que.1(A) Answer the following question. (04)
 Discuss the entropy change in Spontaneous Processes.
- Que.1(B) Answer any two questions out of three. (10)
1. Derive the equation for entropy change of mixing of Ideal Gas.
 2. Derive the equation $\Delta S_p = 2.303nC_p \log \frac{T_2}{T_1}$.
 3. Derive the equation $\Delta A = -W_{rev}$.
- Que.2(A) Answer the following question. (04)
 Define: Degree of freedom & Explain: Influence of Impurity on critical solution temperature.
- Que.2(B) Answer any two questions out of three. (10)
1. Write a detailed note on Weston Standard Cell.
 2. Discuss the Conductometric titration curve of Strong acid with Weak base.
 3. (i) Define: (a) Conductance & (b) Specific resistance.
 (ii) Construct the cell by using given potential values and calculate the standard cell potential at 298 K.
- $$E_{Pb^{+2}/Pb}^0 = -0.13 V \quad \& \quad E_{Cu^{+2}/Cu}^0 = +0.34 V$$
- Que.3(A) Answer the following question. (04)
 Define: Transmittance and derive the mathematical expression of Beer's law.
- Que.3(B) Answer any two questions out of three. (10)
1. Explain: Neutralisation titration curve of strong acid and strong base by Volumetrically in brief.
 2. Write a note on Iodimetry titration with two examples.
 3. Write a note on:
 (a) Substitution Titration & (b) Alkalimetric Titration.
- Que.4(A) Answer the following question. (04)
 At 300 K temperature, 4 moles of an ideal gas expanded from volume 8 lit. to 40 lit. Calculate the entropy change during this process. ($R = 1.987 \text{ Cal} \cdot K^{-1} \text{mole}^{-1}$).
- Que.4(B) Answer any two questions out of three. (10)
1. Derive the Gibbs-Helmholtz Equation.
 2. Discuss the shape of replacement titration curve of CH_3COONa with HCl by Conductometry.
 3. Write a note on spectrophotometric estimation, when lack of absorbance by product and reagent.
- Que.5(A) Answer the following question. (04)
 Discuss the precipitation titration curve of BaCl_2 with K_2SO_4 .
- Que.5(B) Answer any two questions out of three. (10)
1. Derive the Clausius-Clayperon Equation.
 2. Write a detailed note on Standard Calomel Electrode.
 3. Write a note on Mohr's method for Precipitation Titration.
