

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2023 (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)
 ❖ Derive Gibbs – Helmholtz equation.
- Que-1(B) Answer any two questions out of three. (10)
 1. Discuss the entropy change in Irreversible processes.
 2. Explain Carnot cycle with all operations in detail.
 3. Calculate the change in entropy of mixing, when 0.27 mole of Neon gas and 0.73 mole of Xenon gas are mix at given temperature.
(R = 1.987 Cal•K⁻¹mole⁻¹).
- Que-2(A) Answer the following question. (04)
 ❖ Discuss in brief the formation of three pairs of partially miscible liquids in a ternary system.
- Que-2(B) Answer any two questions out of three. (10)
 1. What is secondary reference electrode? Explain in detail Standard Calomel Electrode.
 2. Discuss the conductometric titration curve of Weak acid with Strong base.
 3. 1. List the name of the five factors affecting on Conductance.
 2. Construct the cell by using following potential values and calculate the standard cell potential at 298 K.

$$E_{Ni^{+2}/Ni}^0 = -0.25 V \text{ \& } E_{Cu^{+2}/Cu}^0 = +0.34 V$$
- Que-3(A) Answer the following question. (04)
 ❖ Define: Specific Absorbance and derive the mathematical expression of Lambert's law.
- Que-3(B) Answer any two questions out of three. (10)
 1. Explain: Neutralization titration curve of strong acid and strong base by Volumetrically in detail.
 2. Write a note on Mohr's method for Precipitation titration.
 3. Explain: Masking & Demasking agents in Volumetric analysis.
- Que-4(A) Answer the following question. (04)
 ❖ If temperature of 1 mole of an ideal gas increases from 250 K to 300 K, expansion of an ideal gas occurs from volume 8 lit. to 16 lit. Calculate the entropy change during this process.

$$\left(C_v = \frac{3}{2}R\right) (R = 1.987 \text{ Cal} \cdot K^{-1} \text{mole}^{-1}).$$
- Que-4(B) Answer any two questions out of three. (10)
 1. Derive the Clausius – Clapeyron equation.
 2. Discuss the shape of replacement titration curve of NH₄Cl with NaOH by Conductometry.
 3. Discuss the Selection of filter and Use of prism for the wave-length selection in Colourimetry.
- Que-5(A) Answer the following question. (04)
 ❖ Define:
 (a) Analyte (b) Titrant (c) Titration (d) Blank Titration
- Que-5(B) Answer any two questions out of three. (10)
 1. Derive the Van't Hoff isotherm equation.
 2. Write a detailed note on Weston standard cell.
 3. Write a note on Iodimetry titration with two examples.
