

B.Sc. Semester - 5 (CBCS) Examination

July-2025 (Old 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)**
1) Discuss entropy change in irreversible process.
- Que.1(B) Answer any two questions out of three. (10)**
1) Explain carnot cycle with its operation.
2) Derive the equation of entropy change in an ideal gas at thermodynamic condition.
3) When two mole of ideal gas is heated from 30⁰C to 60⁰C at constant pressure. Find the value of change in entropy (C_p = 30.28 J/mol)
- Que.2(A) Answer the following question. (04)**
1) Discuss the formation of three pair of partially miscible liquids in a ternary system.
- Que.2(B) Answer any two questions out of three. (10)**
1) Explain and derive van't Hoff isotherm equation.
2) Derive Gibbs-Helmholtz equation.
3) Discuss phase rule and define the term phase, component and degree of freedom.
- Que.3(A) Answer the following question. (04)**
1) Write the cell reaction and Nernst equation for following cell at 298K.
 $\text{Sn}_{(s)} \mid \text{Sn}^{+2}_{(aq)} \parallel \text{Pb}^{+2}_{(aq)} \mid \text{Pb}_{(s)}$
- Que.3(B) Answer any two questions out of three. (10)**
1) Define: secondary reference electrode and explain calomel electrode in detail.
2) Discuss: determination of solubility of sparingly soluble salt by emf.
3) Derive mathematical expression for Lambert-Beer's law.
- Que.4(A) Answer the following question. (04)**
1) Discuss conductometric curve for weak acid with strong base.
- Que.4(B) Answer any two questions out of three. (10)**
1) Explain masking and demasking agent.
2) Explain replacement titration of salt of weak acid-strong acid.
3) Explain precipitation titration curve of BaCl₂ by K₂SO₄.
- Que.5(A) Answer the following question. (04)**
1) Explain external redox indicator with example.
- Que.5(B) Answer any two questions out of three. (10)**
1) Write a note on mohl's method for precipitation titration.
2) Explain Volhard's method for the estimation of halides.
3) Explain Iodometry and Iodimetry titration.
