

B.Sc. Semester - 5 (Remedial) (CBCS) Examination**March/April-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)
- (1) Derive the equation: $\Delta G = nRT \ln \frac{p_2}{p_1}$.
- Que-1(B) Answer any two questions out of three. (10)
- (1) Derive Van't Hoff isotherm equation.
 - (2) Calculate the change of entropy of mixing, 44 gm of CO₂ gas and 64 gm O₂ gas at given temperature (R=1.987 Cal•K⁻¹•mole⁻¹).
 - (3) Discuss the entropy change in irreversible processes.
- Que-2(A) Answer the following question. (04)
- (1) Discuss precipitation titration of NaCl against AgNO₃.
- Que-2(B) Answer any two questions out of three. (10)
- (1) Explain Ag/AgCl electrode in detail.
 - (2) Discuss in detail the formation of one pair of partially miscible liquids in a ternary system.
 - (3) Calculate equilibrium constant (K_c) for the reaction occurring in following cell at 298 K.
- $$Ni / Ni_{(aq)}^{+2} // Cu_{(aq)}^{+2} / Cu ; \quad E_{Ni^{+2}/Ni}^0 = -0.25 V \text{ \& } E_{Cu^{+2}/Cu}^0 = 0.34 V$$
- Que-3(A) Answer the following question. (04)
- (1) Derive the mathematical expression of Lambert's law.
- Que-3(B) Answer any two questions out of three. (10)
- (1) Explain: Neutralisation titration curve of weak base and strong acid, volumetrically.
 - (2) Explain: Mohr's method for precipitation titration.
 - (3) Explain: Iodimetry titration with one suitable examples.
- Que-4(A) Answer the following question. (04)
- (1) Give limitations of first law of thermodynamics.
- Que-4(B) Answer any two questions out of three. (10)
- (1) Derive Helmholtz equation.
 - (2) Write a note on Weston standard cell in detail.
 - (3) Discuss following types of spectrophotometric titrations.....
 - (i) Lack of absorbance by product and reagent
 - (ii) Lack of absorbance by product and titrant.
- Que-5(A) Answer the following question. (04)
- (1) Write a note on replacement titration curve of NH₄Cl with NaOH.
- Que-5(B) Answer any two questions out of three. (10)
- (1) Discuss entropy change in reversible process.
 - (2) Write a note on Upper critical solution temperature and Lower critical solution temperature.
 - (3) Explain the principle of Ostwald's law based on indicator.
