

B.Sc. Semester - 5 (Remedial) (CBCS) Examination

March/April-2024 (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 in detail: Entropy change in reversible process.
- Que-1(B) Answer any two questions out of three. (10)
 (1) Discuss the physical significance of entropy in detail.
 (2) Derive the equation for entropy change of mixing of ideal gases.
 (3) Derive the equation $\Delta S_p = 2.303n Cp \log \frac{T_2}{T_1}$.
- Que-2(A) Answer the following question. (04)
 (1) Derive the clausius-clayperon equation.
- Que-2(B) Answer any two questions out of three. (10)
 (1) Derive the Gibbs-Helmholtz equation.
 (2) Discuss in brief the formation of two pair of partially miscible liquids in a ternary system.
 (3) Discuss work function and it's physical importance.
- Que-3(A) Answer the following question. (04)
 (1) Write a note on standard calomel electrode.
- Que-3(B) Answer any two questions out of three. (10)
 (1) Derive the mathematical expression of Lambert-Beer's law.
 (2) Write a note on Weston standard cell in detail.
 (3) (i) Define: (a) Transmittance (b) Molar absorptivity
 (ii) Represent the cell of following half cells and calculate standard cell potential at 298K.

$$E_{Ni^{+2}/Ni}^0 = -0.25 V \quad \& \quad E_{Cu^{+2}/Cu}^0 = +0.34 V$$
- Que-4(A) Answer the following question. (04)
 (1) Discuss the conductometric titration curve of strong acid with a weak base.
- Que-4(B) Answer any two questions out of three. (10)
 (1) Describe the replacement titration curve of *salt of weak acid* with *HCl*.
 (2) Give structure, characteristics and uses of Muroxide and Calcon indicators.
 (3) Discuss: Precipitation titration curve of *BaCl₂* by *K₂SO₄*.
- Que-5(A) Answer the following question. (04)
 (1) Write a note on (a) Diphenyl amine & (b) $K_3[Fe(CN)_6]$ redox indicators.
- Que-5(B) Answer any two questions out of three. (10)
 (1) Explain: Iodometry titration with one examples in detail.
 (2) Explain: Mohr's method for precipitation titration.
 (3) Write a note on primary and secondary standards in volumetric analysis.
