

B.Sc. Semester - 5 (Remedial) (CBCS) Examination**March/April-2025 (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)**
Explain entropy change in reversible process.
- Que.1(B) Answer any two questions out of three. (10)**
1) The efficiency of an actual engine is always less than unity proved by Carnot cycle.
2) Derive equation $\Delta S_T = 2.303nR \log \frac{V_2}{V_1}$
3) Discuss Van't Hoff Isotherm.
- Que.2(A) Answer the following question. (04)**
Define: Conductance and discuss the effect of dilution on conductance, Specific conductance, molar conductance and equivalent conductance
- Que.2(B) Answer any two questions out of three. (10)**
1) Explain reversible and irreversible cell with example.
2) Discuss: equilibrium constant by emf.
3) Discuss the formation of one pair of partially miscible liquids in a ternary system.
- Que.3(A) Answer the following question. (04)**
Explain self-indicator in details.
- Que.3(B) Answer any two questions out of three. (10)**
1) Derive mathematical expression for Lambert-Beer's law.
2) Explain Iodometry and Iodimetry estimation in detail.
3) What is adsorption indicator? Explain Fajan's adsorption method.
- Que.4(A) Answer the following question. (04)**
2 moles of ideal gas expand isothermally from 2L to 20L at 300K Temperature. Calculate the change in free energy of gas. ($R=1.987 \text{ cal K}^{-1} \text{ mol}^{-1}$)
- Que.4(B) Answer any two questions out of three. (10)**
1) Discuss the conductometric curve for mixture of strong acid and weak acid with strong base.
2) Discuss the instrumentation of colorimeter with schematic diagram.
3) What is primary and secondary standard?
- Que.5(A) Answer the following question. (04)**
Explain Weston standard cell.
- Que.5(B) Answer any two questions out of three. (10)**
(1) An heat engine is working at that time temperature of source is 227°C and of sink is 127°C . Calculate the efficiency of heat engine.
(2) (A) At constant temperature 10 mole of an ideal gas expanded from volume 10L to 100L. Find the entropy change. ($R=8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)
(B) Specific conductivity of N/35 KCl at 298K is $0.002768 \text{ ohm}^{-1}\text{cm}^{-1}$ and it has resistance of 520 ohm. A N/25 solution of salt kept in the same cell was found to have a resistance of 300 ohm at 298K. Calculate the equivalent conductance of the solution.
(3) Explain titration curve of polyprotic acid against strong base.
