LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIFTH SEMESTER – **APRIL 2025**

UCH 5502 – PHASE EQUILIBRIA AND CHEMICAL KINETICS

Date: 28-04-2025 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

Answer ANY FOUR of the following **(4 x 10 = 40)**

1. Derive Gibbs phase rule equation.
2. Sketch and explain the phase diagram of lead-silver system and discuss its application in desilverisation of lead.
3. Discuss in detail UCST and LCST with examples.
4. State and explain Raoult's law. Explain the negative deviation from this law with an example.
5. Derive integrated rate constant and Thalf expressions for a first order reaction.
6. What are pseudo unimolecular reactions? Explain with an example.
7. Explain the thermal chain reaction involved in (5+5)
   (i) HBr formation from Hydrogen and Bromine (ii) Dissociation of acetaldehyde
8. Explain the effect of temperature and pH on the rate of enzyme catalysed reactions.

SECTION B

Answer ANY THREE of the following **(3 x 20 = 60)**

9. (a) Draw and explain the phase diagram of water system. (10)
   (b) Derive Clausius-Clapeyron equation. (10)
10. (a) Explain the phase diagram of sulphur system using Gibb's phase rule. (10)
    (b) Outline the principle and theory of azeotropic distillation. (10)
11. (a) Derive thermodynamically the relation connecting elevation in boiling point of solution and its molality. (10)
    (b) State Nernst distribution law. How does it vary when the solute undergoes association in the solvent? (10)
12. (a) Obtain the integrated rate equation for a second order reaction, 2A→products. (10)
    (b) Explain any two methods of determining order of a reaction. (10)
13. (a) Explain opposing, consecutive and parallel reactions in detail with suitable examples. (10)
    (b) Describe the Lindemann's theory of unimolecular reactions. (10)
14. (a) Derive Michaelis – Menten equation and discuss the kinetics of enzyme catalysis. (10)
    (b) Discuss the theory of heterogenous catalysis. (10)
