



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – APRIL 2013

CH 5507 - PHASE EQUILIBRIA AND KINETICS

Date: 11/05/2013
Time: 9:00 - 12:00

Dept. No.

Max. : 100 Marks

SECTION-A

Answer ALL the questions:

(10 x 2= 20marks)

1. State Raoult's law.
2. Write two differences between order and molecularity of a reaction.
3. What is pseudo first order reaction? Give an example.
4. Write the rate equation for the second order reaction $A + B \rightarrow \text{Products}$.
5. Calculate the degree of freedom for a mixture of N_2 and O_2 gases contained in a vessel.
6. At 100°C the half life period for the thermal decomposition of N_2O_5 is 4.6sec. Calculate the rate constant.
7. Differentiate between physisorption and chemisorption.
8. What is Vant Hoff equation?
9. Write the Michaelis-Menton equation for enzyme catalysis.
10. What is heterogeneous catalysis? Give an example.

SECTION-B

Answer any EIGHT questions:

(8 x 5= 40marks)

11. Discuss the features of phase diagram of $FeCl_3 - H_2O$ system.
12. Derive clapeyron – clausius equation.
13. Explain the theory of fractional distillation (Or) steam distillation.
14. Obtain the relationship between Vapour Pressure & Osmotic Pressure.
15. Draw and explain the Vapour Pressure – composition diagram for ideal solution.
16. Derive an expression for rate constant of a second order reaction $2A \rightarrow \text{products}$.
17. Write the mechanism of S_N2 reaction and discuss its order and molecularity.
18. What are chain reactions? Show the steps involved in the formation of HBr.
19. Explain absolute reaction rate theory.
20. Discuss Lindeman hypothesis for unimolecular reactions.

SECTION-C

Answer any FOUR questions

(4 x 10 = 40 marks)

21. Draw the labelled phase diagram of H₂O system and discuss its salient features in detail. (10)
22. Explain the phase diagram of lead-silver system and discuss its application in desilverisation of lead. (10)
23. (a) Derive the thermodynamic relationship for elevation of boiling point. (7)
- (b) 0.44g of a substance dissolved in 22.2g of benzene lowered the freezing point by 0.567°, $K_f = 5.12^\circ\text{C kg mol}^{-1}$. Calculate the molecular mass of the substance. (3)
24. (a) State and explain Nernst distribution law. How does it vary when the solute undergoes association in the solvent? (5)
- (b) Discuss the phenol-water system. (5)
25. Explain opposing, consecutive and parallel reactions with suitable examples (10)
26. (a) Derive Arrhenius equation and explain the effect of temperature on rate of the reaction. (5)
- (b) Deduce Langmuir theory of adsorption isotherm and discuss its behaviour at high and low temperatures. (5)

\$\$\$\$\$\$