



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – NOVEMBER 2016

CH 5507/CH 5512 – PHASE EQUILIBRIA AND KINETICS

Date: 05-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer **ALL** questions

(10 x 2= 20)

1. State the phase rule.
2. Define the term degrees of freedom.
3. 18.2 g of urea is dissolved in 100 g of water at 50 °C. The lowering of vapour pressure produced is 5 mm Hg. The vapour pressure of water at 50 °C is 92 mm Hg. Calculate the molecular weight of urea.
4. What are isotonic solutions?
5. Define the term molecularity.
6. What are pseudo unimolecular reactions? Give an example.
7. What are parallel reactions?
8. What is the effect of temperature on the rate of chemical reactions?
9. What is Wilkinson's catalyst? What is its use?
10. Distinguish between physisorption and chemisorption.

PART-B

Answer any **EIGHT** questions

(8 x 5= 40)

11. Derive the phase rule equation.
12. Draw and explain the phase diagram of sulphur system.
13. Explain the determination of molecular weight by Berkeley and Hartley method.
14. Derive Nernst distribution law.
15. State and explain Raoult's law. Explain the negative deviation from this law with an example.
16. The reaction $A+B \rightarrow C+D$ is of second order and at 0°C; the value of the rate constant is 39 litres $\text{mole}^{-1}\text{min}^{-1}$. If the reactants are 0.004 molar in A and 0.005 molar in B. How much of time will 'A' take for 90% of it to react?
17. Distinguish between the terms order and molecularity.

18. Compare thermal and photochemical chain reactions.
19. Enumerate the various factors influencing the rate of a reaction.
20. The first order thermal decomposition of an organic compound has the Arrhenius frequency factor $8.7 \times 10^{15} \text{ sec}^{-1}$. Evaluate the energy of activation if the rate constant is $1.74 \times 10^{-4} \text{ sec}^{-1}$ at 300°K .
21. Explain the various factors influencing the rate of enzyme catalysed reactions.
22. Explain the Langmuir adsorption isotherm.

PART-C

Answer any **FOUR** questions

(4x10=40 marks)

23. Draw and explain the phase diagram of lead-silver system.
24. a) 1.250 g of naphthalene is dissolved in 60 cm^3 of benzene and freezing point of the solution is found to be 277.515 K , while that of benzene 278.495 K . Density of benzene is 0.880 g/cm^3 , $k_f = 5.1$ per 1000g of benzene. Calculate the molecular weight of naphthalene. (6)
 - a) What is the effect of adding NaCl on the CST of phenol-Water system?(4)
25. Write a note on the following
 - a) Steam distillation (5)
 - b) Enzyme catalysis in biological systems. (5)
26. Derive the rate equation of a second order reaction.
27. a) What are opposing reactions? (2)
 - b) Discuss the various steps involved in the dissociation of acetaldehyde. (8)
28. Derive Michelis–Menton equation.
