LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2016**

CH 5512/CH 5507/CH 5500 – PHASE EQUILIBRIA & KINETICS

Date: 30-04-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer **ALL** questions (10x2=20 marks)

1. What is 'Triple point' in phase diagram?
2. Write the condensed phase rule equation and explain the various terms involved in it.
3. 18.2 g of urea is dissolved in 100g of water at 50^{o}C. The lowering of vapour pressure produced is 5mm Hg. The vapour pressure of water at 50^{o}C is 92mm Hg. Calculate the molecular weight of urea.
4. What is Van't Hoff' factor?
5. Enumerate the differences between order and molecularity.
6. What are zero order reactions? Give an example
7. What are consecutive reactions?
8. What is the effect of temperature on the rate of chemical reactions?
9. Define turn over number.
10. What is Wilkinson's catalyst? What is its use?

PART-B

Answer any **EIGHT** questions (8x5=40 marks)

11. Drive Gibbs phase rule.
12. Draw and explain the phase diagram of sulphur system.
13. State and explain Raoult's law. Explain the negative deviation from this law with an example.
14. Define critical solution temperature. Explain the effect of addition of solute on it with an example.
15. Write a note on azeotropic distillation.
16. The reaction A+B→C+D is of second order and at 0^{o}C; the value of the rate constant is 39 litres mole^{-1}min^{-1}. If the reactants are 0.004 molar in A and 0.005 molar in B. How long it will take for 90% of A to react?
17. Derive an expression for the rate constant of a first order reaction.
18. Enumerate the various factors influencing the rate of a reaction.
19. Explain collision theory of bimolecular reactions.
20. Compare thermal and photochemical chain reactions.
21. Explain the effect of temperature and pH of enzyme catalysed reactions.
22. Write a note on Langmuir adsorption isotherm.

PART-C

Answer any **FOUR** questions (4x10=40 marks)

23. Draw and explain the phase diagram of the following systems.
    a) Water system b) $FeCl_3 - H_2O$ system.
24. (a) How is molecular weight determined by Berkley and Hartley method?
    (b) Write a note on steam distillation.
25. Explain any two methods of determining the order of a reaction.
26. a) What are parallel reactions?
    b) Discuss the mechanism of H_2-Br_2 chain reaction.
27. Derive Michaelis – Menton equation.
28. (a) 1.250g of naphthalene is dissolved in $60cm^3$ of benzene and the freezing point of the solution is found to be 277.515 K, while that of benzene 278.495K. Density of benzene is $0.880g/cm^{-3}$, $k_f = 5.1$ per 1000g of benzene. Calculate the molecular weight of naphthalene.
    (b) Explain the theory of heterogeneous catalysis.

$$$$$$$