LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **NOVEMBER 2017**

CH 5512 / CH 5507 – PHASE EQUILIBRIA & KINETICS

Date: 06-11-2017   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART – A

Answer ALL the questions.   (10x2=20)

1.   What is condensed phase rule?
2.   Define congruent melting point.
3.   What are isotonic solutions?
4.   Give two limitations of Nernst distribution law.
5.   The rate constant for a first order reaction is $1.54 \times 10^{-3} s^{-1}$. Calculate its $t_{1/2}$.
6.   Give an example each for first order and zero order reactions.
7.   How does ionic strength affect the rate of a reaction?
8.   Mention one example for (i) opposing reaction (ii) consecutive reaction.
9.   What is Wilkinson's catalyst? Mention its specific use.
10. What are the characteristics of enzyme catalysis?

PART – B

Answer any EIGHT questions.   (8x5=40)

11. The melting point of ice is higher than that of ice mixed with salt.   Why?
12. Discuss the salient features of the phase diagram of Pb-Ag system.
13. State and explain Raoult's law.
14. Discuss the principle and theory of steam distillation.
15. The molar heat of vaporization of water at $100^{o}C$ is 40.585 kJmol^{-1}. At what
     temperature will a solution of glucose boil at pressure 634 mm of mercury?
16. Describe any two methods of determination of order of a reaction.
17. Calculate the activation energy of a reaction whose rate constant is tripled by a $10^{o}C$
     rise in temperature from the initial temperature of $27^{o}C$.
18. Compare and contrast absolute reaction rate theory and collision theory.
19. Explain the kinetics of chain reaction with one example.
20. Explain the kinetics of acid catalysed ester hydrolysis.
21. State and explain the factors that affect the rate of enzyme catalysis.
22. Explain Langumir adsorption isotherm.

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PART – C

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

23.   Draw the phase diagram for Ferric chloride-water system in which the two

        Components form a stable compound with congruent melting point.

24.   Derive theromodynamically the relation connecting elevation in boiling point of a

        Solution and its molality.

25. (a) Derive Clausius – Clapeyron equation.   **(5)**

    (b) Discuss the theory of heterogenous catalysis.   **(5)**

26. (a) Explain the differential method of determination of order of a reaction.   **(5)**

    (b) Explain in detail how the following factors affect the rates of chemical reactions:

              (i)   solvent polarity   (ii)   Catalyst   **(5)**

27. (a) Explain the kinetics of parallel reactions.   **(5)**

    (b) Write briefly on the kinetics of opposing reactions.   **(5)**

28.   Discuss the mechanism and kinetics of enzyme catalysis with Michaelis – Menton

        Model in detail.

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