



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – APRIL 2017

CH 5512 / CH 5507- PHASE EQUILIBRIA & KINETICS

Date: 28-04-2017
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL questions.

(10 x 2 = 20 marks)

1. Define the term phase.
2. What is a triple point? Give an example.
3. Calculate the boiling point constant for water which boils at 100°C and has a latent heat of vaporisation of 540 calories per gram.
4. State Raoult's law.
5. What is zero order reaction? Give an example.
6. Define the rate constant.
7. Write the Arrhenius equation and define the terms involved in it.
8. Calculate the ionic strength of 0.1M KCl solution.
9. What is Wilkinson's catalyst? Write one application of it.
10. Explain enzyme catalysis.

PART – B

Answer any EIGHT questions.

(8 x 5 = 40 Marks)

11. Derive Gibb's phase rule equation.
12. Derive Clausius – Clapeyron equation. Give its applications.
13. Derive thermodynamically the relation connecting elevation in boiling point of a solution and its molality.
14. Explain critical solution temperature. What is the effect of addition of solute on it?
15. Explain any two applications of Nernst distribution law.
16. Derive the rate constant for second order reaction. Explain its characteristics.
17. Show that for a first-order reaction, the time required for 99.9% completion of the reaction is ten times that required for 50% completion.
18. The value of E_a for a reaction is 35 kcal for a temperature rise of 10° from 25°C to 35°C. What would be the ratio of rate constants?
19. Explain the kinetics of parallel reactions with an example.
20. Discuss the ARRT in detail.
21. Discuss the homogenous catalysis with an example.
22. Explain the Langmuir's unimolecular adsorption isotherm.

PART – C

Answer any FOUR questions.

(4 x 10 = 40 Marks)

23. Explain and draw the phase diagram of Lead – Silver system.
Apply the relevant phase rule equation.
24. (a) Discuss Van't Hoff's theory of dilute solutions.
(b) Explain Henry's law.
25. Explain any two of the following :
- (a) Steam distillation
(b) Solvent Extraction
(c) Factors affecting enzyme catalysis
(d) Phase diagram of three component system
26. Explain any three methods of determining order of a reaction.
27. Explain the collision theory of unimolecular and bimolecular reaction.
28. Derive Michaelis–Menton equation and discuss the kinetics of enzyme catalysis.
