



Date: 03-05-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

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 osmotic pressure of a 5% solution of sucrose in water at 300K.
4. State Raoult's law.
5. What is zero order reaction? Give an example.
6. What are pseudo first order reactions? Give an example.
7. What is the effect of ionic strength on the rate constant of the reaction of the type $A^+ + B^- \rightarrow AB$ in solution phase.
8. Calculate the ionic strength of 0.1M KCl solution.
9. What is Wilkinson's catalyst? Write one application of it.
10. What is enzyme catalysis?

PART – B

Answer any EIGHT questions.

(8 x 5 = 40 marks)

11. Derive Gibb's phase rule equation.
12. Obtain Clausius – Clapeyron equation. Give its applications.
13. Derive thermodynamically the relation connecting elevation in boiling point of a solution and its molality.
14. Discuss Van't Hoff's theory of dilute solutions.
15. Explain critical solution temperature. What is the effect of addition of solute on it?
16. Derive the rate constant for First 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. Explain the kinetics of parallel reactions with an example.
19. Discuss Lindemann's hypothesis.

20. Trichloroacetic acid in aniline solvent (acting as catalyst) decomposes to give chloroform and carbon dioxide. The rate constant for this reaction is $4.0 \times 10^{-5} \text{ min}^{-1}$ at 45°C . Calculate the energy of activation for this reaction.
21. Explain the Langmuir's unimolecular adsorption isotherm.
22. Discuss bimolecular reactions in solid surfaces.

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. Discuss Nernst distribution law. Explain its applications.
25. Explain any two of the following :
- (a) Steam distillation
 - (b) Solvent Extraction
 - (c) Factors affecting enzyme catalysis
 - (d) ARRT
26. Explain any THREE methods of determining order of a reaction.
27. Explain the collision theory of unimolecular and bimolecular reactions.
28. Derive Michaelis – Menton equation and discuss the kinetics of enzyme catalysis.
