LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIFTH SEMESTER – **NOVEMBER 2019**

16/17UCH5MC02 / CH 5500 / CH 5507 / CH 5512 – PHASE EQUILIBRIA AND KINETICS

Date: 31-10-2019   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART – A

Answer **ALL** questions   (10 X 2= 20)

1. State the reduced phase rule.

2. What is meta stable equilibrium?

3. State Henry's Law.

4. Find the molal elevation constant of water which evaporates at 100^0C with the absorption of 40669.2 J per mole (R=8.314 J/K/ mole)

5. What is the difference between order and molecularity of a reaction?

6. Calculate the $t_{1/2}$ of a first- order reaction whose rate constant is $7.1 X 10^{-3} s^{-1}$

7. Define entropy.

8. Calculate the ionic strength of 0.25M K_2SO_4.

9. What are catalytic promoters? Give an example.

10. Define turnover number of an enzyme?

PART – B

Answer any **EIGHT** questions   (8 X 5= 40)

11. How will you apply reduced phase rule to Pb-Ag system?

12. Explain the formation of a compound with incongruent melting point.

13. Derive Gibbs Phase Rule.

14. Explain the effect of addition of solute on Critical Solution Temperature.

15. Write a short note on solvent extraction.

16. The rate constant of a second-order reaction is $5.7 X 10^{-5} dm^3 mol^{-1} s^{-1}$ at 25^0C and $1.64 X 10^{-4} dm^3 mol^{-1} s^{-1}$ at 40^0C. Calculate the activation energy.

17. In a first - order reaction, it takes 40.5 minutes for the reactant to be 25% decomposed. Calculate the rate constant of the reaction.

18. Explain any two methods of determining the order of a reaction

19. Explain parallel and consecutive reactions. Give examples.

20. Discuss the Collision theory of bimolecular reactions

21. Explain the methods used to determine the V_{max} of an Enzyme catalysed reaction.

22. Write a note on adsorption and intermediate compound formation theory.

PART – C

Answer any **FOUR** questions   (4 X 10= 40)

23. Draw schematically the phase diagram of water and apply Gibbs phase rule to it.

24. Describe Nernst distribution law. Derive an expression that would be applicable for the dissociation of a solute in one of the phases.

25. Derive an expression for the relation between osmotic pressure and vapour pressure lowering of an ideal solution.

26. Derive the integrated rate expression for second order reaction when the concentration of the reactants are equal.

27. Discuss in detail the Lindemann theory of unimolecular reactions.

28. What is meant by acid-base catalysis? Discuss the kinetics of an acid-base catalysed reaction.

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