LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **NOVEMBER 2018**

CH 5507 / CH 5512– PHASE EQUILIBRIA & KINETICS

Date: 01-11-2018   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART –A

Answer All the Questions: **(10 x 2 = 20 Marks)**

1. Calcualte the number of components present in the following systems.

    i) $CaCO_3$ (s) <——> CaO (s) + CO_2 (g)

    ii) NH_4Cl (s) <——> NH_3 (g) + HCl (g)

2. Mention the significance of Eutectic point.

3. What are colligative properties?

4. State Raoults law.

5. What is rate law of a chemical reaction?

6 .Define order of a reaction.

7. What is activation energy?

8. Write any two drawbacks of collision theory.

9. Mention the characteristics of a catalyst.

10. What are the types of catalysis? Give an example for each type.

PART –B

Answer any EIGHT questions: **(8 x 5 = 40 Marks)**

11. State Gibbs phase rule and explain the terms involved.

12.Draw and discuss the phase diagram of one component system of water.

13. Discuss briefly the steam distillation of liquids.

14. Derive the vant Hoff equation for the osmotic pressure of a solution.

15. Give the thermodynamic basis for Nernst distribution law and mention its applications.

16. For a certain first order reaction, $t_{0.5}$ is found to be 100 s. How long will it take for the reaction to become 75% completed?

17. Obtain an expression for the rate constant of a second order reaction of the type $A + B \rightarrow$ Products.

18. Explain the influence of the factors that affect chemical reactions.

19. Derive Arrhenius equation and mention its importance.

20. Write a short note on the transition state theory of reaction rates.

21. Discuss the kinetics of an acid – base catalyzed reaction.

22. What is an enzyme catalyzed reaction? Mention its uses.

PART –C

Answer any FOUR questions: **(4 x 10 = 40 Marks)**

23. Explain the phase diagram of a compound formed with (i) congruent (ii) incongruent melting point.

24. What is depression in freezing point? Obtain an expression relating the freezing point depression of a solution with the mole fraction of a dissolved solute.

25. Discuss any two methods to determine the order of a reaction.

26. Obtain an expression for the rate constant of bimolecular gaseous reaction on the basis of collision theory.

27. Derive Michaelis-Menten equation for an enzyme catalyzed reaction.

28.(a) Explain the following with an example. (i) Negative catalyst (ii) Catalytic poision.

    (b) The vapour pressures of pure CCl_4 (Mol.wt = 154 g/mol) and $SnCl_4$ (Mol.wt = 170 g/mol) at 25° C are 114.9 and 238.3 torr respectively. Assuming ideal behavior, calculate the total vapour pressure

of a solution containing 10 g of CCl_4 and 15 g of $SnCl_4$.   **(5+5)**

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