LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2019**

16UCH5MC02 / CH 5512 – PHASE EQUILIBRIA AND KINETICS

Date: 16-04-2019 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer **ALL** questions **(10x2=20 marks)**

1. What is 'Triple point' in phase diagram?
2. Define the term degrees of freedom.
3. What is critical solution temperature?
4. 18.2 g of urea is dissolved in 100g of water at 50^{o}C. The lowering of vapour pressure produced is 5mm Hg. The vapour pressure of water at 50^{o}C is 92mm Hg. Calculate the molecular weight of urea.
5. Define the term rate constant.
6. What are pseudo first order reactions? Give an example.
7. What is the effect of temperature on the rate of chemical reactions?
8. What are opposing reactions?
9. What is turnover number?
10. What do you mean by degree of inhibition?

PART-B

Answer any **EIGHT** questions **(8x5=40 marks)**

11. Derive the Clausius – clapeyron equation.
12. Draw and explain the phase diagram of sulphur system.
13. Explainthe relationship between osmotic pressure and vapour pressure of a solution.
14. Write a note on azeotropic distillation.
15. The partial pressure of bromine over a bromine-CCl_4 solution containing mole fraction of bromine equal to 0.025 is 10.27 torr. If the vapour pressure of pure bromine at the same temperature is 213 torr, what is the activity coefficient of bromine in the given solution?

16. Distinguish between the terms order and molecularity.

17. The time for half change in a first order decomposition of a substance A is 60 seconds. Calculate the rate constant. How much of A will be left after 180 seconds?

18. Write a note on Lindeman hypothesis.

19. Explain the various factors that affect the rate of chemical reactions.

20. Explain the effect of temperature and pH on enzyme catalysed reactions.

21. What is acid-base catalysis? Explain with examples.

22. Write a brief note on the intermediate compound theory of catalysis.

PART-C

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

23. Draw and explain the phase diagram of acetic acid – chloroform – water.

24. Derive Nernst distribution law. Explain its applications.

25. a) Explain the principle and the procedure involved in fractional distillation.

    b) Derive an expression for the rate constant of a first order reaction. **(5+5)**

26. Derive the rate equation of a second order reaction of the type $2A \longrightarrow$ Product.

27. a) Discuss the kinetics of H_2-Br_2 reaction. **(8+2)**

    a) Define the term ionic strength.

28. Derive Michelis – Menton equation.

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