Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University) Coimbatore-641 043
Bachelor's Degree Examination–November -2018
V Semester

Class: III UG **Time: 3 hours**
Major :Chemistry **Max.Marks: 100**

NBCHC15/ **15BCHC 15 – Chemical Kinetics and Phase Rule**

Part-A **10x1=10**

Choose the correct answer

1. In the reaction $KMnO_4 + H_2SO_4 + H_2C_2O_4$, the product Mn^{2+} ion act as a /an.
   a. Positive Catalyst b.Negative Catalyst c. enzyme Catalyst
   d. autocatalyst

2. The adsorption of gases on metal surface is called
   a.absorption b.Catalysis c.Occlusion d. desorption

3. The number of eutectics in the phase diagram for $FeCl_3$ – Water system is.
   a.6 b.5 c.4 d. 3

4. Phase rule is
   a.F = C- P+2 b.F = C - P+3 c.P +C = F+2 d. F = P+C-P

5. "If a solute X distributes itself between two immiscible solvents A and B at constant temperature and X is in the same molecular condition in the Solvents" This law is
   a. Raoult's law b. Henry's law c.Nernst distribution law d. Kohlrauch's law

6. Which one is partially miscible liquids?
   a.Benzene-water b.Nicotine-Water c. Alcohol-water d. Petrol-water

7. Hydrolysis of an ester by NaOH is a typical..... order reaction.
   a.Zero b. First c.Second d. Third

8. The half-life period of a reaction is independent of the initial concentration of the reactants. The reaction is of
   a. First order b. Zero order c. Second order d. third order

9. According to Collision theory, the rate of a reaction depends on
   a. the average Collision of molecules b. the total number of molecules
   c. the number of colliding molecules per ml per unit time d.none of those

10. The equation which expresses the effect of temperature on the velocity constant of reaction is
    a. Faraday b. Avogadro's equation c. Nernst equation d. Arrhenius equation.

Part-B **5X6=30**

Answer the following

Answer should not exceed 400 words or two pages

11.a. What do you mean by adsorption and absorption, adsorbent and adsorbate?

(or)

11. b. Define the term enzyme Catalysis. Derive Michelis – Menton equation.

12. a. State and explain phase rule and reduced phase rule.

(or)

12.b.Draw and explain the phase diagram of Pb-Ag system.

13.a.State and explain Nerns't distribution law. Give its applications. Mention its limitations.

(or)

13.b.Write a short note on (i) ideal and non-ideal solution. (ii) Azeotropic mixtures. (3+3)

14.a.Define rate and rate constant. Derive the rate constant K for third order reaction.

(or)

14b. i. Distinguish between Order and Molecularity. (2)

ii. Give any one example for zero, first, second and third order reactions. (4)

15.a.What are the Significance of free energy of activation and entropy of activation?

(or)

15. b. Explain the Lindemann's theory of unimolecular reaction.

Part C 5x12=60

Answer the following

Answer should not exceed 800 words or four pages

16. a. i. Distinguish between physisorption and chemisorption. (3)

ii. Derive Langmuir adsorption isotherm equation. Under what conditions it becomes identical with freundlich adsorption isotherm equation. (9)

(or)

16.b.(i) What is mean by catalysis? How is it classified? Give suitable examples. (6)

(ii) Write a short note on BET adsorption isotherm. (6)

17.a.(i) Draw and explain the phase diagram of water system and sulphur system.

(or)

17. b.(i) What is mean by eutectic point and Congruent m.p? (5)

(ii) Draw and explain the phase diagram of KI – Water system. (7)

18.a.(i) State and explain Raoult's law. (4)

(ii) Explain the principle under lying the process of steam distillation. (8)

(or)

18.b.(i) What are immiscible and Partially missible liquid system? Give suitable examples. (5)

(ii) Discuss about phenol water system with a neat sketch. (7)

19. a. Describe the following experimental techniques used for the determination of rate of reaction.

(i) Polari metric (ii) Manometric Method.

(or)

19.b.Derive the rate Constants K for first order reaction and second order reaction (if the initial Concentrations of the reactants are different)

20.a. (i) Compare collision theory and ARRT. (8)

(ii) Write Arrhenius equation and explain its terms. (4)

(or)

20. b.(i) What are the limitations of Collision theory? (4)

(ii) Discuss the ARRT. What are the advantages of ARRT over CT? (8)

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