A   Reg. No. :

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Question Paper Code: 54904

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fourth Semester

Chemical Engineering

15UCH404 – PHYSICAL CHEMISTRY

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. When one of product is removed from the reaction the direction of reverse reaction i   CO1- R

   (a) Forward   (b) Backward   (c) in equilibrium   (d) both a & b

2. In a chemical reaction, the concentration of one of the reactant remains constant for _____ reactions   CO1- R

   (a) pseudo order   (b) first order   (c) zero order   (d) fractional order

3. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to   CO2- R

   (a) Increace in ionic mobility of ions   (b) Increase in number of ions

   (c) both a& b   (d) None of these

4. Conductometric methods can be used for the analysis of _____ solutions.   CO2- R

   (a) concentrated   (b) colored   (c) non-colored colloidal   (d) brine

5. The three phases namely solid, liquid and gas will coexist in equilibrium at _____ point.   CO3- R

   (a) triple   (b) reduced   (c) stationary   (d) crossover

6. The important factor influencing the solubility of a gas in liquid is   CO3- R

   (a) viscosity   (b) density   (c) surface tension   (d) pressure

7. Ideal solutions obey   CO4- R

    (a) Raoult's law   (b) The distribution law

    (c) Oswald's law   (d) All of these

8. When one of the substances formed during the reaction acts as a catalyst for that reaction, then it is called as_____.   CO4- R

    (a) negative catalysis   (b) autocatalysis   (c) promoters   (d) accelerators

9. Which of the following can act as a protective colloid?   CO5 R

    (a) Gelatin   (b) Siliga gel   (c) Oil in water mulsion   (d) All of these

10. Which of the following is not an example of colloid?   CO5- R

    (a) Milk   (b) Paint   (c) Blood   (d) Isotonic solution

PART – B (5 x 2= 10Marks)

11. Write any two difference between molecularity and order of the reaction   CO1- R

12. State Ostwald's dilution law.   CO2- R

13. State condense phase rule.   CO3- R

14. What is heterogeneous catalysis? Give examples.   CO4- R

15. Justify the use of gelatin as a protective colloid.   CO5- R

PART – C (5 x 16= 80Marks)

16. (a) (i) What is meant by First order kinetics? Derive the kinetics of First order kinetics.   CO1- U   (10)

      (ii) Explain the effect of temperature on reaction rate using Arrhenius equation.   CO1- U   (6)

                                  Or

    (b) (i) Explain the mechanism involved in chain reaction with suitable example.   CO1-U   (8)

      (ii) Discuss the determination of rate constant for the reactions taking place in solutions.   CO1-U   (8)

17. (a) State kohlrausch's law of independent migration. Discuss its applications in detail   CO2 -U   (16)

                                    Or

    (b) (i) Define specific conductivity and Equivalent Conductivity.   CO2- U   (6)

      (ii) Briefly outline the main ideas of the Debye-Huckel Theory for strong electrolytes.   CO2- U   (10)

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18. (a) Explain the phase diagram of two component system with suitable example .   CO3-U   (16)

<div align="center">Or</div>

(b) (i) State distribution law. Explain the applications of distribution law.   CO3- U   (8)

(ii) State Henry's law and Raoult's law. Discuss its applications in gas – liquid system.   CO3- U   (8)

19. (a) (i) Explain the mechanism involved in the two classes of adsorption processes.   CO4- U   (6)

(ii) Discuss the calculation of adsorption isotherm parameters using: Freundlich equation and Langmuir equation.   CO4- U   (10)

<div align="center">Or</div>

(b) (i) Derive the Michaelis - Menten equation for an enzyme catalyzed reactions.   CO4-App   (12)

(ii) Define catalysis. Classify the various types of catalysis with suitable examples   CO4-App   (4)

20. (a) Discuss the preparation of colloidal solutions by the following methods: CO5- U   (16)
 (i) Mechanical dispersion,
(ii) Peptization
(iii) double decomposition.

<div align="center">Or</div>

(b) Discuss briefly the kinetics of addition and condensation polymerization   CO5- U   (16)

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