SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(Chemistry) END SEMESTER EXAMINATIONS APRIL-2023
SEMESTER - V
20UCHCT5011 - PHYSICAL CHEMISTRY-I

Total Duration : 2 Hrs 30 Mins.   Total Marks : 60

Section B

Answer any SIX questions $(6 \times 5 = 30$ Marks)

1. Find the boiling point of a solution containing 0.36 g of glucose $(C_6H_{12}O_6)$ dissolved in 100 g of water (Kb = 0.52 K/m).

2. State phase rule and explain the following terms: (i) Phase (ii) Component (iii) Degree of freedom.

3. Derive an expression for rate constant of first order reaction.

4. Illustrate consecutive, parallel and reversible reactions with example.

5. Distinguish between physisorption and chemisorption.

6. Discuss the effect of temperature on the rate of a reaction.

7. Explain the kinetics of unimolecular surface reactions.

8. Calculate the freezing point of a solution containing 0.520 g of glucose $(C_6H_{12}O_6)$ in 80.2 g of water. For water $K_f = 1.86$ K kg mol^{-1}.

Section C

Answer any THREE questions $(3 \times 10 = 30$ Marks)

9. (i) A solution of 12.5 g of urea in 170 g of water gave boiling point elevation of 0.63 K. Calculate the molar mass of urea. $K_b = 0.52$ K kg mol^{-1}.   (5)
   (ii) Derive the Duhem Margulas equation for binary mixtures.   (5)

10. Draw the labelled phase diagram for ferric chloride - water system and explain with the help of phase rule.

11. (i) Write Arrhenius equation for the effect of temperature on rate of reaction.
    (ii) Calculate the activation energy of a reaction whose reaction rate at 27°C gets doubled for 10°C rise in temperature.

12. Discuss the features of theory of absolute reaction rates.

13. Discuss the Freundlich and Langmuir theories of adsorption.

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