

B.Sc.- I (New CBCS Pattern) Semester-II
USCCHT04 - Chemistry Paper-II - Physical Chemistry

P. Pages : 2

Time : Three Hours



GUG/W/24/11575

Max. Marks : 50

1. a) Find minimum and maximum value of- 5
 $f(x) = 2x^3 - 9x^2 + 12x - 3$

- b) Define hydrolysis constant. Describe the relationship between hydrolysis constant and dissociation constant of salt of weak acid and weak base. 5

OR

- c) What is buffer solution? Explains mechanism of acidic buffer action. 2½

- d) Write a note on common-ion effect. 2½

- e) Find the equation of line passing through the point (0, 2) & (1, 4) 2½

- f) Explain the term permutation and combination. 2½

2. a) i) Explain state function and path function with example. 5

- ii) State and explain Hess's law of constant heat summation.

- b) State Joule-Thomson effect? Describe Joule's Thomson porous plug experiment. 5

OR

- c) State and explain intensive and extensive properties. Give an example of each. 2½

- d) Derive Kirchoff's equation. 2½

- e) State 1st law of thermodynamics in various forms. Give its mathematical expression. 2½

- f) Define: Heat capacity and derive the relation between $C_p - C_v = R$. 2½

3. a) What are the postulates of kinetic theory of gases? Deduce Avogadro's law from kinetic gas equation. 5

- b) Derive Van der Waal's equation of state. 5

OR

- c) Derive Charle's law. 2½

- d) What are the causes of deviation from ideal behaviour. 2½

- e) Write a notes on effect of temperature on molecular velocity. 2½

- f) The critical constants for water are $T_C = 647\text{K}$; $P_C = 218\text{atm}$; $V_C = 0.0571\text{ lit mol}^{-1}$. Calculate Van Der Waals constant. 2½
4. a) Define surface tension? Explain drop method for the determination of surface tension of liquid. 5
- b) Derive Bragg's equation. 5
- OR**
- c) Define the terms: 2½
 i) Parachor
 ii) Intrinsic viscosity.
 Explain the effect of temperature on viscosity of liquids.
- d) State and explain law of constancy of interfacial angle. 2½
- e) Find Miller indices of Lattice plane which intersect coordinate axis at 2, -3, 1. 2½
- f) Discuss determination of viscosity by Ostwald Viscometer. 2½
5. Solve **any ten**. 10
- a) Find the derivative of x^4 w.r.t x .
- b) Define : (i) Solubility (ii) Solubility product
- c) Define pH of solution.
- d) Define the term isobaric process.
- e) What do you mean by bond dissociation energy?
- f) What is enthalpy of reaction?
- g) Define Root mean square velocity.
- h) What is compressibility factor?
- i) Define collision number.
- j) Draw the structure of NaCl.
- k) Define (i) Lattice point (ii) Unit cell
- l) Define and write unit of viscosity.
