B.Sc.- I (CBCS Pattern) Semester-II

USCCHT04 - Chemistry Paper-II - Physical Chemistry

P. Pages : 2 **GUG/S/25/11575**

Time : Three Hours * 1 5 2 5 * Max. Marks : 50

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1. a) Find maxima and minima values of $x^3 - 12x + 10$. **5**

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

OR

c) Define degree of ionization. Explain the factor affecting. **2½**

d) What do you mean by permutation and combination? Find the value of ${}^6P_4$. **2½**

e) What is buffer solution? Explains mechanism of acidic buffer action. **2½**

f) Find the equation of line passing through the point (0,2) & (1,4). **2½**

2. a) Define Joule Thomson effect? Explain Joule Thomson porous plug experiment to show expansion of ideal gas is enthalpic process. **5**

b) State and explain Hess's Law. The heat of combustion of gaseous Methan at constant volume is 1885.4KJmol - - at 298K. Calculate the enthalpy change. **5**

OR

c) Define molar heat capacity and derive the relation between C_p and C_v. **2½**

d) Derive Kirchhoff's equation. **2½**

e) State and explain intensive and extensive properties. Give an example of each. **2½**

f) Define : Adiabatic process and state first law of thermodynamic in two different ways. **2½**

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

b) State and explain maxwell's distribution law of molecular velocities. **5**

OR

c) Show that the excluded volume of gas is four times the actual volume of the gas. **2½**

d) Define compressibility factor. How does it vary with pressure in case of real gases. **2½**

e) The critical constants for water are $T_C = 647K$; $P_C = 218atm$; $V_C = 0.057 lit.mol^{-1}$. Calculate Van Der Waals constant. **2½**

f) Draw well labelled diagram for isotherms of carbon dioxide showing Critical Phenomenon? **2½**

4. a) Explain : **5**

i) Law of constancy of interfacial angles.

ii) Law of rationality of indices.

b) Define viscosity. Explain Ostwald viscometer method for the determination of viscosity liquid. **5**

OR

c) Find miller indices of Lattice plane which intersect coordinate axis at 2, -3, 1. **2½**

d) Describe the crystal structure of CsCl by Laue's method. **2½**

e) Explain Bravais lattice. **2½**

f) Explain effect of temperature on viscosity. **2½**

5. Attempt **any ten.** **1x10 =10**

a) Find the slope of the line that passes through the points (2,7) and (2,-6).

b) The pH of acidic solution is 2.70. Calculate the hydrogen ion concentration of this solution.

c) Define i) Solubility ii) Solubility product.

d) State any two statement of 1^{st} law of thermodynamic

e) Define : State function and path function.

f) Define thermodynamics variable or state variable.

g) Define RMS velocity

h) Give reduced equation of state.

i) Define Critical Temperature?

j) What is mean by Parachor value.

k) Define elements of symmetry?

l) Define lattice point?

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