B.Sc. (Part-I) (CBCS Pattern) Sem-II

USCCHT04 - Chemistry Paper-II : Physical Chemistry-II

P. Pages : 2 **GUG/W/22/11575**

Time : Three Hours * 3 7 4 1 * Max. Marks : 50

Notes : 1. All question are compulsory and carry equal marks.
2. Log table & calculator are allowed.

1. a) Using log table find the value of **5**

$$\left[\frac{45.12\times1.39}{0.512\times3.26}\right]^{1/2}$$

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

OR

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

d) Find partial differentiation of x^4+2x^2+3xy with respect to x. **2½**

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

f) The solubility product of AgCl at 30ºC is 1.5×10^{-10} Calculate its solubility mg/dm^3 at same temperature. **2½**

2. a) Define Joule - Thomson effect? Describe Joule Thomson porous plug experiment. **5**

b) Derive expression for heat capacity at constant volume and constant pressure. Also derive relation between them. **5**

OR

c) Explain intensive and extensive properties. **2½**

d) Explain integrating factor. **2½**

e) Explain the term Enthalpy. **2½**

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

3. a) Derive the Kinetic gas equation for one mole on ideal gas. **5**

b) Derive the relation between critical constant and Vander Waal constant. **5**

OR

c) Calculate average velocity of hydrogen molecule at 27°C $\left(R = 8.314 J K^{-1} mol^{-1}\right)$ **2½**

d) Deduced Boyle's law from Kinetic gas equation. **2½**

e) What are the causes of deviation from ideal behaviour. **2½**

f) State and explain law of corresponding state. **2½**

4. a) Define surface tension? Explain drop method for the determination of surface tension of liquid. **5**

b) State and explain **5**
i) Law of constancy of interfacial angle.
ii) Element of symmetry

OR

c) Explain law of rationality of indices. **2½**

d) Explain. **2½**
i) Relative viscosity.
ii) Intrinsic viscosity.

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

f) Explain Bravais lattice. **2½**

5. Solve **any ten**. **10**

i) Evaluate $\frac{20!}{4!\,3!}$

ii) Define degree of dissociation.
iii) Define pH of solution.
iv) Define Isothermal process & Isobaric process
v) What is inversion temperature.
vi) State Hess's law.
vii) Define
  a) Root mean square velocity.
  b) Most probable velocity.
viii) State any two postulates of kinetic theory of gas.
ix) Explain compressibility factor.
x) Define viscosity.
xi) Draw the structure of NaCl.
xii) Define
  a) Unit cell.
  b) Miller Indices.

****