

B.Sc. CBCS Pattern Semester-III
USCCHT06 - Chemistry Paper-II : Physical Chemistry

P. Pages : 2

Time : Three Hours



GUG/W/23/11601

Max. Marks : 50

- Notes : 1. All **five** questions are compulsory and carry equal marks.
2. Write equations and draw diagrams wherever necessary.

1. a) Describe Sulphur system with the help of phase diagram. **5**

b) State and explain Nernst Distribution Law. In the distribution of benzoic acid between water and benzene, the following results were obtained. **5**

C_1 [in water]	1.50	1.95
C_2 [in Benzene]	24.2	41.2

Show that Benzoic acid exists as a dimer in Benzene.

OR

c) Explain the term- **2½**

- i) Number of components ii) Degrees of freedom

d) Draw the phase diagrams of the systems with- **2½**

- i) Congruent melting points ii) With incongruent melting points

e) State Henry's Law and give its limitations. **2½**

f) Write a note on steam distillation. **2½**

2. a) Derive an expression for entropy change when an ideal gas expands from V_1 to V_2 at constant temperature. **5**

Calculate entropy change when 2 moles of an ideal gas is heated from 40°C to 50°C at constant pressure. The molar heat capacity at constant pressure of the gas is 30.28 J deg⁻¹ in this temp. Range.

b) Explain 'chemical potential'. Derive Gibb's – Duhem equation. **5**

OR

c) Explain the significance of work function [A]. **2½**

d) Calculate free energy change when 4 moles of ideal gas expand from 10 atm to 1 atm at constant temperature of 298k. **2½**

e) Derive Van't Hoff equation. **2½**

f) Discuss entropy as criteria of spontaneity and equilibrium. **2½**

3. a) Explain 'Order of Reactions'. Derive integrated rate equation for second order reactions when initial concentrations of reactants are equal. **5**

b) State the postulates of 'transition state theory'. Derive expression for the rate constant based on equilibrium constant. **5**

OR

