

BS/2051

Chemistry (Sem - IV)

T23/MH

Paper III: Physical Chemistry

Max. Marks: 26

Time Allowed: 3 hours

Attempt Two from each of section A and B and Section C is compulsory.

**Section A**

1. Draw the phase diagram for two components (solid-liquid) system and apply the phase rule. 4
2. Magnesium and zinc form stable compound with congruent melting point. Draw the phase diagram for the system and apply phase rule. 4
3. Write Debye-Huckel Onsagar's equation and write its limitations. 4
4. Discuss the uses and limitations of Ostwald's dilution law. 4

**Section B**

5. Define transport number and briefly describe one method used for its determination. 4
6. Discuss the various applications of conductance measurement. 4
7. What do you mean by term buffer action? Describe the mechanism by which acidic buffer resist the change in pH on addition of small amount of acid/ base. 4
8. What are concentration cells? Give two examples. Write the Nernst equation for any concentration cell. 4

**Section C**

9. A) The pH of water at 298 K is  $10^{-7}$ . On increasing the temperature, the pH increases to  $10^{-6.5}$ . Whether the water is now acidic, alkaline or neutral? Justify your answer.  
B) The dissociation constant of aqueous solution of weak acid is  $K_a$  at 298 K. if initial concentration of acid is doubled then what will be the value of new dissociation constant. Justify your answer.  
C) What do you mean by liquid junction potential? How is it removed?  
D) For two component system, what will be the maximum number of phases as per Gibbs phase rule? Justify your answer.  
E) Calculate the various degrees of freedom for  $\text{CO}_2$

(5 × 2 = 10)