

II B.Tech I Semester Supplementary Examinations, May 2005

PHYSICAL CHEMISTRY

(Chemical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

- Explain the distribution coefficient of a solute between two immiscible solvents.
 - Discuss the applications of distribution law.
- Describe in detail any one detector used in HPLC.
 - What do you understand by Isocratic and Gradient elutions?
- Explain why lowering of vapor pressure is a colligative property?
 - Discuss the reasons for deviation from Rault's law.
 - Obtain mathematical relations between lowering of vapor pressure and
 - degree of dissociation and
 - degree of association.
- Discuss the phenomenon of osmosis and its origin.
 - Explain how osmosis is a colligative property?
 - Derive a relationship between molecular weight and elevation in boiling point.
- The following data were obtained in a colorimetric study of the concentration of $CuSO_4$:-

$[CuSO_4] \times 10^4$ moles/litre	0.4	0.8	1.2	2.0	0.4	0.8	3.2
Absorbance	0.11	0.21	0.33	0.54	0.65	0.75	0.86

Verify, graphically that the data is consistent with Beer's law.

- Write briefly on the factors affecting the fluorescence phenomena.
- What is transport number? How is it related to the speeds of migration of ions? Describe any one method for the determination of transport number of ions?
 - Discuss the effect of temperature on the viscosity of a liquid.
 - The dipole moment of chloro- and nitrobenzene are 1.55 D and 3.8 D. Calculate the dipole moment of m-di-chlorobenzene and o-di-nitrobenzene.
 - Obtain a relation between Van't Hoff factor and degree of dissociation of solute.
 - An aqueous solution of $K_4Fe(CN)_6$ freezes at $-0.062^\circ C$. Calculate the percentage of dissociation. ($K_f = 1.86$)
