



EASTERN UNIVERSITY, SRI LANKA
FIRST SEMESTER SECOND EXAMINATION IN SCIENCE
2006/2007 (Dec.2008)
CH 202 ANALYTICAL CHEMISTRY

Time: One hour

Answer all questions

1. (a) Draw a labeled diagram to show the basic components of a Gas Chromatograph and briefly describe the function(s) of each component
- (b) Compare and contrast planar chromatography and column chromatography.
- (c) Give three advantages and three disadvantages in Atomic Absorption Spectroscopy (AAS).
- (d) Describe a method to determine the concentration of Fe^{3+} ions concentration in an unknown solution using colourimetry.

2. (a)
 - (i) V ml of an aqueous solution (V_{aq}) which contain a_0 mol of solute X is brought into contact with V ml of immiscible organic solvent (V_{org}). At equilibrium a_1 mol of solute X remains in the aqueous layer.

Show that

$$a_1 = \frac{a_0 V_{\text{aq}}}{V_{\text{aq}} + V_{\text{org}} K}$$

Where K is Partition Coefficient of the solute of X between organic layer and aqueous layer.

- (ii) Give the equation for the number of moles of solute X remaining after 'n' extractions.
 - (iii) Distribution coefficient of the solute X between the organic layer and aqueous layer is 10. A 50.0 ml of 0.125 mol l^{-1} aqueous solution of X was extracted with 20.0 ml of organic solvent. How many times should it be extracted to reduce the concentration of X in aqueous to 0.005 mol l^{-1} ?
- (b) The concentration of a standard solution of Vanadium is 0.5 M. The percentage transmittance by this solution when placed in a cell of thickness 1 cm is 65. The unknown solution of Vanadium when placed in the same cell transmits 75% light. Find out the concentration of unknown vanadium solution.