



EASERN UNIVERSITY, SRI LANKA

SECOND YEAR FIRST SEMESTER EXAMINATION IN SCIENCE 2021/2022

(MARCH/ APRIL 2024)

CH2021 ANALYTICAL CHEMISTRY

Answers all questions

Time: One hour

1.

(a)

(i) *Explain* the principle involve in the solvent extraction

(20 Marks)

(ii) V ml of aqueous solution (V_{aq}) which contains A_0 mol of solute X is brought into contact with V ml of immiscible organic solvents (V_{org}). At equilibrium A_1 mol of solute X remains in the aqueous layer.

Show that

$$A_1 = \frac{A_0 V_{aq}}{V_{aq} + V_{org} K}$$

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

(20 Marks)

(iii) *Give* the equation for the number of moles of solute X remaining after 'n' extraction

(10 Marks)

(iv) 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} ?

(20 Marks)

(b) *Discuss* the basic principle involved in the colorimetric method

(30 Marks)

2.

(a) Briefly *describe* the Paper Chromatography and explain how the separated compounds can be identified and analysed?

(35 Marks)

(b) Briefly *explain* the different types of Paper Chromatography with suitable diagrams.

(30 Marks)

(c)

(i) *Describe* the 'Ion Exchange Chromatography' and discuss the factors determining the distribution of ions in 'Ion Exchange Chromatography'

(15 Marks)

(ii) Briefly *discuss* the applications of 'Ion Exchange Chromatography'

(20 Marks)
