



EASTERN UNIVERSITY, SRI LANKA

SECOND YEAR FIRST SEMESTER EXAMINATION IN SCIENCE-2009/2010

[EXTERNAL DEGREE]

(June/August 2012)

EXTCH 202 Analytical Chemistry

Answer all questions

Time: 01 hour

1. (a) (i) Explain the term 'Ion exchange capacity of a resin. [20 marks]
- (ii) Briefly explain, how does ion exchange resin soften water. [20 marks]
- (b) Explain what is meant by two dimensional development techniques in TLC. [20 marks]
- (c) State Beer-Lambert's law and explain all the terms involved in it. [20 marks]
- (d) What is the difference between 'distribution-coefficient' and 'distribution-ratio' in liquid- liquid extraction. [20 marks]
2. (a) (i) What is meant by the phrase "Solvent Extraction"? List the advantages of using solvent extraction in the Analytical Chemistry. [25 marks]
- (ii) Outline the theory behind in the solvent extraction process [30 marks]
- (b) Consider a separation of weak acid (HA) by solvent extraction. Suppose  $K_a$  is the ionization constant of weak acid and  $K_D$  and  $D$  are the partition coefficient (organic/aqueous phase) and distribution ratio respectively. Derive the expression to relate the distribution ratio  $D$  with  $K_a$ ,  $K_D$  and  $[H^+]$  as indicated below.
- $$D = \frac{K_D}{1 + \frac{K_a}{[H^+]}}$$
- [30 marks]
- (c) List out the four different separation mechanisms in chromatography based on the physical properties of the stationary phase. [15 marks]
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