(b) Derive expression for the rate of solute migration as a function of its distribution constant.

(c) Define eluent, stationary phase, retention time, retention factor and distribution constant. (4,6,5)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4016 **H**

Unique Paper Code : 2172541201

Name of the Paper : DSC : Separation Methods I

Name of the Course : **Bachelor of Science in Analytical Chemistry**

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **Four** questions.

1. (a) Explain the principle of differential migration.
   (b) Define column efficiency and R_f value.
   (c) Explain the terms involved in Van Deemter equation to describe chromatographic efficiency. (5,4,6)

2. (a) Describe ascending and radial modes of development of paper chromatogram?

(b) Differentiate between liquid-liquid and liquid-solid chromatography.

(c) In paper chromatographic separation of silver, lead and mercury the sol vent front was 18 cm while fronts due to these elements were respectively 14,12 and 5 cm. Calculate R_f value of all metals. (5,4,6)

3. (a) Discuss the plate preparation in thin layer chromatography TLC.

How to choose the mobile phase in TLC.

(b) Describe the types of stationary phases used in TLC with examples.

(c) What is the role of a visualizing agent and what are some most commonly used visualizing agents. (6,5,4)

4. Write short notes on ANY **THREE** : (5,5,5)

(a) Batch extraction

(b) Discontinuous extraction

(c) Adsorption Chromatography

(d) Partition Chromatography

5. (a) What is dialysis? Explain the three types of dialyser membranes.

(b) 25 millilitres of an aqueous solution of 0.1 M butyric acid is shaken with 10ml ether. After the layers are separated, it is determined by titration that 0.5mmol butyric acid remains in the aqueous layer. What is the distribution ratio and what is the percent extracted?

(c) Give applications of nitrocellulose and fiberglass in dialysis. (5,6,4)

6. (a) Explain the working of Craig's apparatus.