

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3074

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Unique Paper Code : 2172541201

Name of the Paper : Separation Methods I

Name of the Course : **B.Sc. (Prog.) 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.

Q.1.

- a. Define the terms elution time, elution volume and column efficiency in chromatography.
- b. Classify chromatographic methods. Explain how differential migration affect chromatographic process.
- c. How does longitudinal and eddy diffusion parameters affect column efficiency.
(4, 5, 6)

Q.2.

- a. Describe ascending, descending and radial modes of development of paper chromatogram?
- b. Differentiate between adsorption and partition chromatography.
- c. In paper chromatographic separation of nickel, cobalt and cadmium the solvent front was 15 cm while fronts due to these elements was respectively 5,4 and 2 cm. Calculate R_f value of all metals.
(4, 5, 6)

Q.3.

- a. What are the factors affecting reproducibility of R_f values?
- b. Discuss the conditions with reference to the stationary phase and the solvent used in TLC.
- c. Discuss the steps involved for plate preparation in thin layer chromatography. How do we analyze the components quantitatively? Give applications of TLC.
(4, 5, 6)

P.T.O.

Q.4. Write short notes on ANY THREE

- a. Distribution law
- b. Van Deemter equation
- c. Capacity factor
- d. Discontinuous extraction

(5,5,5)

Q.5.

- a. Explain dialysis and membrane filtration.
- b. Give applications of nitrocellulose and fibreglass in dialysis.
- c. A solute has partition coefficient $K=4$ between an organic solvent and water. If 100ml of aqueous solution is extracted with 100 ml of organic solvent, calculate the percentage extracted in one extraction.

(4,5,6)

Q.6.

- a. Discuss continuous solvent extraction methods.
- b. Why is multiple extraction more efficient than single extraction? What are the factors which affect solvent extraction?
- c. Calculate the distribution ratio when a solute is shaken with water and ether. The equilibrium concentrations of ether and water is 8g/L and 2g/L respectively.

(4,5,6)