This question paper contains **3** printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **5964**

Unique Paper Code : **2172541201**

Name of the Paper : **DSC : Separation Methods–I**

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

Semester : **II**

Duration : **2 Hours** Maximum Marks : **60**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *four* questions.

1. (*a*) Define the terms elution time and elution volume in chromatography.

   (*b*) Discuss frontal, displacement and elution methods of chromatographic separation.

   (*c*) Explain the terms involved in Van Deemter equation to describe chromatographic efficiency. 4,5,6

2. (*a*) Describe ascending and descending modes of development of paper chromatogram.

   (*b*) Differentiate between adsorption and partition chromatography.

P.T.O.

(*c*) In paper chromatographic separation of nickel, cobalt and cadmium the solvent front was 20 cm while fronts due to these elements was respectively 12, 10 and 4 cm. Calculate R_f value of all metals. 4,5,6

3. (*a*) What are the factors which affect the reproducibility of R_f values ?

(*b*) Discuss the chromatographic conditions with reference to the static phase and the solvent used in thin layer chromatography.

(*c*) Discuss the steps involved for plate preparation in thin layer chromatography. What are the conditions required for choosing the stationary phase in TLC ? 4,5,6

4. Write short notes on any *three* :

(*a*) Counter current extraction

(*b*) Continuous extraction

(*c*) Capacity factor

(*d*) Partition Chromatography. 5,5,5

5. (*a*) Explain dialysis. Explain the types of dialyser membranes.

(*b*) 20 millilitres of an aqueous solution of 0.1 M butyric acid is shaken with 10 ml ether. After the layers are separated, it is determined by

titration that 0.45 m mol butyric acid remains in the aqueous layer. What is the distribution ratio and what is the percent extracted ?

(*c*) Give applications of polycarbonates and fibreglass in dialysis. 4,5,6

6. (*a*) Explain the process of batch extraction used to separate two immiscible liquid phases.

(*b*) Discuss the *three* stages of solvent extraction process.

(*c*) In solvent extraction of uranium with 8-hydroxyquinoline in $CHCl_3$ the volume of aqueous and organic phase was respectively 25 ml when percentage extraction was 99.8%. Calculate the distribution ratio. 4,5,6