T4228 / T1831 2) ADVANCED SEPERATION TECHNOLOGY

BE (Chem) Sem-VIII CBSGS May-2012 Q.P.Code:09984

[Total Marks: 80]

(3 Hours)

N. B. (1) Question No. **1. is compulsory.**

(2) Attempt any **three** questions from remaining **five** questions.

(3) Assume Suitable data whenever required.

(4) **Figures to right** indicate **full** marks.

Q.1 Answer the following (any **four**): **(20)**

(a) Give classification of Foam Fractionation techniques with suitable examples.

(b) Explain Retention time, Retention volume and Resolution in LC.

(c) Write a short note on Characteristics of modern adsorbents.

(d) Write a short note on Ion Exchange chromatography.

(e) Write a short note on activated Silica as adsorbent.

(f) Describe membrane and give its classification based on driving forces.

Q.2

(a) Discus the construction and working of any one type of flotation equipment used for waste Water Treatment. **(10)**

(b) Discuss briefly different membrane modules, its working and uses in membrane processes. **(10)**

Q.3

(a) Explain in brief different modes of operation of a foam column. **(10)**

(b) Discuss the application of adsorption process in N_2 and O_2 separation from air. **(10)**

Q.4

(a) Briefly describe chromatographic separation of Enzymes and Proteins. **(10)**

(b) A dialysis process is being designed to recover a certain solute from dilute solution having solute concentration 2.0×10^{-2} kg mol/m^3 through a membrane to a solution having solute concentration 0.3×10^{-2} kg mol/m^3. The membrane is 1.59×10^{-5} m thick. The mass transfer coefficients in upstream and downstream are 3.5×10^{-5} m/s and 2.1×10^{-5} m/s respectively. Calculate: **(10)**

i. The permeability when steady state flux is 2.492×10^{-8} kg mol solute /h.m^2.
ii. Diffusivity of solute through membrane when distribution coefficient is 0.75.
iii. The individual resistances and total resistance.

Q.5

(a) Explain Following membrane characterization techniques: **(10)**

(i) Scanning electron microscope
(ii) Bubble Point method

(b) Write short note on membrane fouling, its method of measurement and reduction. **(10)**

Turn Over

Q.6 Write a note on any **four** of the following:- **(20)**

(a) Micro filtration.

(b) Preparative Chromatography.

(c) Bubble Separation Techniques.

(d) Molecular Sieves as an adsorbent.

(e) Thermal Swing Adsorption.