Printed Pages: 4 ECH-601

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 151601	Roll No.

B.TECH.

Theory Examination (Semester-VI) 2015-16

MASS TRANSFER OPERATION - II

Time : 3 Hours ***Max. Marks : 100***

Note: Attempt all sections.

Section-A

1. Attempt all the parts. All parts carry equal marks. (2×10=20)

(a) Define Rayleigh equation for batch distillation.

(b) Distinguish among 5 possible phase conditions of feed.

(c) What do you mean by Azeotropes?

(d) What is the need of condenser and reboiler in a distillation column.

(e) What do you mean by liquid liquid extraction.

(f) Define relative volatility

(g) Define leaching.

(h) Define reverse osmosis.

(i) Define Raoults law.

(j) Define selectivity.

Section-B

2. Attempt any five parts of the following. (10×5=50)

(a) Explain in brief, triangular diagram for system with one pair partially miscible.

(b) Explain the principle of steam distillation and give its uses in chemical process industries.

(c) A mixture of 35 mole % A and 65 mole % B is to be separated in distillation column. The concentration of A in the distillate is 93 mole % and 96 mole % of component A is recovered in distillate. The feed is half vapor and reflux ratio is 4:1. The relative volatility is α_{AB} = 2.5. Calculate the number of theoretical plates in the column?

(d) What is the significance of break point and break through curves for adsorption? In what way is its useful during design. Also give the applications of ion exchange in chemical industries.

(e) Experiments on De colorization of oil yielded the following equilibrium relationship

$y=0.5x^{0.5}$

where y = g colour removed / g adsorbent

x=colour in oil, g colour /1000g colour-free oil.

100 kg oil containing 1 part of colour to 3 parts of oil is agitated with 25kg of adsorbent. Calculate the % colour remove if

i) all 25kg of adsorbent is used in one-step

ii) 12.5 kg of adsorbent is used initially, followed by another 12.5 kg of adsorbent.

(f) Define and explain leaching differentiate between moving bed leaching and dispersed solid leaching.

(g) What is Tie-line? Explain the difference between single stage, multistage co current, multi stage cross current and multi stage counter current extraction with their relative demerit and de merits.

(h) Compare Brunavers five types of adsorption isotherms for pure gases.

Section-C

Attempt any two parts of the following. (15×2=30)

3. Derive the equations for the operating lines of rectifying and stripping sections Used according to the ponchon-savarit method for the design of distillation column. State the assumptions clearly.

4. Describe major methods for regenerating adsorbent and what are the most commonly used adsorption isotherms for gases and liquids explain in brief.

5. It is proposed to extract acetic acid from aqueous solution using ethyl acetate as a solvent. It is known that ethyl acetate and acetic acid are completely miscible. If the initial composition of aqueous solution is given and the ratio of the rate of aqueous solution to the rate of solvent stream is fixed at a certain value, explain by making a sketch of a ternary, equilibrium diagram how you would proceed to determine the number of counter current contact necessary for effecting the extraction if the raffinate liquor composition is specified for the above case.