

Roll No.

Total Pages : 2

BT-6/M-20

36063

MASS TRANSFER-II

Paper-CHE-302-E

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt any *five* questions, selecting at least *one* question from each unit. Assume any missing data.

UNIT-I

1. What are various methods used to calculate number of stages in distillation column. Explain the McCabe Theile method, in detail with the help of neat sketch. (20)
2. Write short note on following :
 - (a) Reflux ratio.
 - (b) Azeotropic and extractive distillation.
 - (c) Multi component distillation.
 - (d) Differential distillation of binary systems. (4×5=20)

UNIT-II

3. Write short note on following :
 - (a) Adsorption and selection of adsorbant.
 - (b) Gas liquid contact plate columns.
 - (c) Tower packings.
 - (d) Limiting liquid/ gas ratios. (4×5=20)

4. Define HETP. 800 kg/hr of an air-carbon tetrachloride mixture containing 5 mol% CCl_4 is to be scrubbed in a counter-current packed tower to recover 90% CCl_4 . A non-volatile CCl_4 -free oil ($M = 260$) will be used as solvent and the solvent rate will be 820 kmol/hr. The mass transfer coefficient K_{ya} has been estimated to be $25 \text{ kmol}/(\text{hr})(\text{m}^3)(\text{atm})$. Determine the number of transfer units required and hence, the packed height of the tower. The equilibrium relationship is given by $y^* = 20x$, where y^* and x are the mole fractions of CCl_4 in gas and liquid respectively. The total pressure is 1 atm. (20)

UNIT-III

5. Explain with the help of neat sketch the equilibrium relationship for partially miscible and immiscible system in case of Liquid-Liquid extraction. (20)
6. What is the significance of quality of solvent in extraction process? Write the constructional detail of RDC with the help of neat sketch. (20)

UNIT-IV

7. (a) Discuss about adsorption equilibrium with the help of adsorption isotherms. (10)
- (b) Explain desirable properties of adsorbents with the help of giving suitable examples. (10)
8. Classify and explain with the help of neat sketch, various mode of operation of adsorption. (20)