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Roll No

CM-5003-CBGS

B.E. V Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Mass Transfer - I

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Classify different mass transfer operations.
b) Discuss the selection of separation method for a mass transfer operation with suitable examples.
2. Explain the Panchon-Savarit method and derive the formula for calculation of number of theoretical plates in a distillation column.
3. Derive Kremser-Brown-Souders Equation for calculation of number of theoretical stages for given separation in gas absorption column.
4. A gas mixture containing 65% NH_3 , 8% N_2 , 24% H_2 and 3% Argon is flowing through a pipe 25mm in diameter at a total pressure of 4 atm. The velocities of the components are as follows $\text{NH}_3 = .03\text{m/s}$, $\text{N}_2 = .03\text{ m/s}$ $\text{H}_2 = .035\text{ m/s}$ and argon = .02 m/s. Calculate the mass average velocity, the molar average velocity and the volume average velocity of the gas mixture.

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5. Draw the P-x-y, T-x-y and x-y diagram for maximum boiling azeotrope and minimum boiling azeotrope and show that the relative volatility of an ideal binary mixture is equal to the ratio of vapor pressures of components.
6. What are the main objections against the penetration and surface renewal theories of interphase mass transfer? How these can be overcome in subsequent theories?
7. a) Write short notes on :
 - i) Azeotropic distillation
 - ii) Extractive distillationb) Explain the Vapor-Liquid Equilibria and Relative Volatility.
8. Discuss the following:
 - a) Hydrodynamics and packed tower.
 - b) Minimum liquid to gas ratio in absorption.

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