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Roll No .....

**CM-504 (GS)**  
**B.E. V Semester Examination, June 2020**  
**Grading System (GS)**  
**Mass Transfer - I**  
*Time : Three Hours*

**Maximum Marks : 70**

**Note:** i) Attempt any five questions.  
ii) All questions carry equal marks.

1. a) Define relative volatility.  
b) Define Boiling point elevation and freezing point depression.
  2. Compare characteristics of plate and packed columns used in mass transfer.
  3. Discuss the significance of mass transfer coefficients. Explain the analogy of mass transfer coefficients with similar coefficients of other transfer operations.
  4. Discuss the principles, operation and industrial applications of the following giving examples.
    - i) Extractive distillation
    - ii) Molecular distillation
  5. If mass transfer resistance is essentially all in the gas phase, derive the following equation:
6. When are the concepts of HETP and HTU used? What is the difference between the two? Drawing an equilibrium diagram, indicate clearly the two concepts.
7. Solutions of methanol and ethanol are substantially ideal. Compute the vapour-liquid equilibrium data for this system at 1 atm pressure, and plot  $x-y^*$  and  $t-x-y$  diagrams. Compute also the relative volatilities and its average value. The vapour pressure temperature (T in °C) relationship are:

$$\text{Log } P_{\text{MeOH}}, \text{ mm Hg} = 7.84863 - \frac{1473.11}{230 + T}$$

$$\text{Log } P_{\text{EtOH}}, \text{ mm Hg} = 8.04494 - \frac{1554.3}{222.65 + T}$$

OR

Write down the properties of a good packing for an absorption tower. Write few industrial application of absorption.

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8. Answer any two of the following.
- Explain Co-current and counter current process in detail.
  - Explain penetration theory.
  - What is Flooding and Loading.
  - Under what condition morphine plate efficiency and point efficiency will equal.

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