

Total No. of Questions :6]

SEAT No. :

**P66**

[Total No. of Pages :2

**Oct./TE/ Insem. - 185**

**T.E. (Chemical Engineering)**

**CHEMICAL ENGINEERING THERMODYNAMICS - II**

**(2015 Course) (Semester - I)**

*Time : 1 Hour]*

*[Max. Marks :30*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data, if necessary.*

**Q1) a)** Derive the Equation for  $\mu_i$  using Ideal gas Model [7]

b) What is Chemical Potential? [3]

OR

**Q2) a)** Derive the following equation [5]

$$\overline{M}_1 = M + x_2 \frac{dm}{dx_1} \quad \text{and} \quad \overline{M}_2 = M - x_1 \frac{dm}{dx_1}$$

b) Derive the equation for showing multiple phases at same T and P are in equilibrium when Chemical Potential of each species is same in all phases [5]

**Q3) a)** Explain the Effect of T and P on VLE [5]

b) Explain the Concept of Azeotropes. [5]

OR

**P.T.O.**

- Q4)** a) Derive the Equation for Excess Gibbs Energy. [4]  
b) Define the following Terms [6]  
i) Fugacity and Fugacity coefficient  
ii) Activity Coefficient

**Q5)** Write a short note on. [10]

- a) Phase Rule and Duhems Theorem  
b) Raoult's Law and Modified Raoult's Law  
c) Henry's Law

OR

- Q6)** a) Derive the Equation for Dew and Bubble Point Calculation using Modified Raoult's law. [5]  
b) Explain the Concept of Flash Calculation [5]

