R09

Code No: D5101

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II - SEMESTER EXAMINATIONS, APRIL/MAY 2012
ADVANCED SEPARATION PROCESSES
(CHEMICAL ENGINEERING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1. A liquid mixture of cyclohexanone (1) / pheno1 (2) for which $x_l = 0.6$ is in equilibrium with its vapor at 417.15 K. Determine the equilibrium pressure P and vapor composition y_l from the following information:

   $\ln \gamma_1 = Ax_2^2$, $\ln \gamma_2 = Ax_1^2$. At 417.15 K, $p_1^{sat} = 75.2kPa$, $p_2^{sat} = 31.66kPa$

   The system forms an azeotrope at 417.15 K for which $x^{az} = y^{az} = 0.294$.

2. a) Define Raoult's law & Henry's law.
   b) Explain the flash calculation procedure.

3. Derive Kremser-Brown equation & discuss its limitations.

4. How do you select a separation process for a particular mixture? Explain it based on energy requirement. Give some case studies.

5. How do you determine minimum reflux ratio using under wood's method?

6. What is "pervaporation"? Explain the principle involved in it. Give the applications of Pervaporation

7. a) Describe about the classification & characteristics of membrane separation processes.
   b) Define the terms 'concentration polarization' & 'gel polarization'.

8. Write short notes on the following
   a) Deprister's charts
   b) Bio membranes
   c) Kirk's-Bridge equation.

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