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AA-181

M. Tech. EXAMINATION, May 2017

(First Semester)

(B. Scheme) (Re-appear Only)

(CHE)

CHE-501-B

MODELING AND SIMULATION

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Make suitable assumptions wherever necessary.

Unit III

5. Develop the model for a Batch Distillation with Hold up. **15**

6. Develop the model for Gas-liquid bubble reactor. **15**

Unit IV

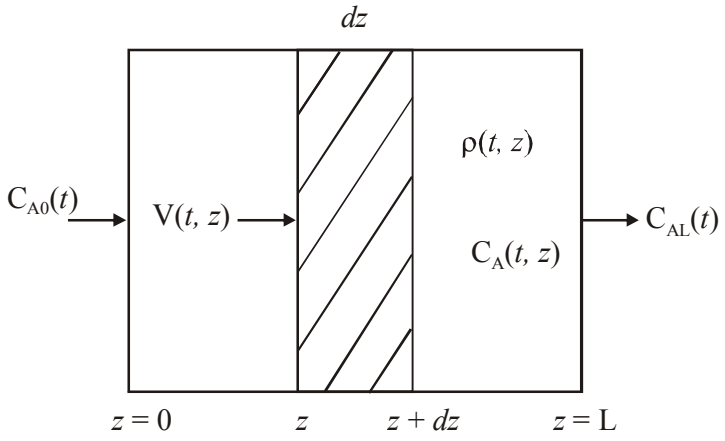
7. Two tanks are connected in series in interaction mode. Develop the mathematical model for each of the two tanks. **15**

8. Develop a model for Trickle Bed Reactor. **15**

Unit I

1. Write the component continuity equations for a tubular reactor with the following reaction : **15**

$$A \xrightarrow{k} B$$



2. Write short notes on any *three* of the following :

(a) Equations of Motion

(b) Energy Equations

(c) Lumped *vs*. Distributed parameter model

(d) Chemical Kinetics.

Unit II

3. (a) Use the Runge-Kutta fourth order method to find the values of $y(0.2)$, $y(0.4)$ and $y(0.6)$ given that $y(0) = 0$ and that : **8**

$$\frac{dy}{dx} = 1 + y^2$$

(b) Solve, by Euler's method, the equation :

$$\frac{dy}{dx} = -2x^3 + 12x^2 - 20x + 8.5$$

given $y(0) = 1$; choose $h = 0.5$ and compute $y(1)$ and $y(2)$. **7**

4. Develop the mathematical model for series of Isothermal contant-holdup CSTRs shown in the following figure : **15**