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## **COLLEGE OF ENGINEERING**

### **DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING B.ENG. CHEMICAL ENGINEERING PROGRAMME**

#### **Computer Applications in Chemical Engineering II (CHE 471) Assignment II**

*Given Date: 01/10/2018  
Submission Date: 07/10/2018*

#### **PROBLEM STATEMENT**

The model equations of a CSTR with a first-order reaction  $A \rightarrow B$  are given as in Equations (1) and (2),

$$\frac{dC_1}{dt} = -\left(\frac{F}{V} + k\right)C_1 + \frac{F}{V}C_{Af} \quad (1)$$

$$\frac{dC_2}{dt} = kC_1 - \frac{F}{V}C_2 \quad (2)$$

where subscripts 1 and 2 refer to components A and B, respectively. Given that  $\frac{F}{V} = 0.2 \text{ min}^{-1}$ ,

$k = 0.2 \text{ min}^{-1}$  and  $C_{Af} = 1 \frac{\text{gmol}}{\text{litre}}$ , and if the initial values of the concentrations are zero, with the

aid of MATLAB/Simulink, obtain the graphical dynamic responses of the system from  $t = 0$  to  $t = 45$  min. Write the steady-state values of the concentrations.