



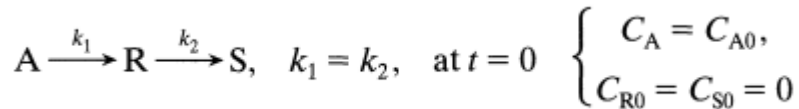
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Department of Chemical Engineering & Bio Technology

**Assignment No.2**

Subject: Chemical Reaction Engineering-I

***Interpretation of Batch Reactor Data***

Q1. For the elementary reactions in series



Find the maximum concentration of R and when it is reached.

Q2. Aqueous A at a concentration  $C_{A0} = 1$  mol/ liter is introduced into a batch reactor where it reacts away to form product R according to stoichiometry  $A \rightarrow R$ . The concentration of A in the reactor is monitored at various times, as shown below:

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t (min)	0	100	200	300	400
$C_A$ (mol/m <sup>3</sup> )	1000	500	333	250	200

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Q3. The first-order reversible liquid reaction takes place in a batch reactor. After 8 minutes, conversion of A is 33.3% while equilibrium conversion is 66.7%. Find the rate equation for this reaction.



Q4. Aqueous A reacts to form R ( $A \rightarrow R$ ) and in the first minute in a batch reactor its concentration drops from  $C_{A0} = 2.03$  mol/liter to  $C_{Af} = 1.97$  mol/ liter. Find the rate equation for the reaction if the kinetics is second- order with respect to A.