

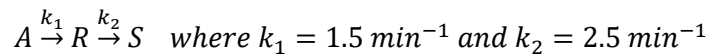
Reaction Engineering, 2021
Test-4, Time-1hr

Q1. For the parallel reactions



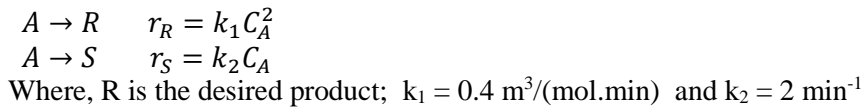
R is the desired product and S is unwanted. Select the proper contacting scheme in a continuous flow reacting system for maximizing the desired product concentration. [5]

Q2. For the irreversible unimolecular type series reactions



- What size of plug flow reactor maximizes the desired product (R) concentration, C_R for a feed flow rate 100 L/min? $C_{A0} = 100$ gmol/L. Compare the size of mixed flow reactor for maximizing C_R . Calculate the maximum desired product concentration for both PFR and mixed reactor.
- How the desired product concentration will vary with the change of space time from 2 min to 10 min for mixed reactor? [5]

Q3. Liquid reactant A decomposes as per the following reactions:



An aqueous solution of A enters the plug flow reactor with $C_{A0} = 40 \text{ mol/m}^3$. Mixture of A, R and S leaves the reactor. Find the space time (τ_P), C_R , and C_S for the plug flow reactor. [5]

Q4. (a) How can you find the exit age distribution plot from a response curve obtained by using a step-input tracer? [2]

(b) Describe a method for prediction of conversion for a first-order reaction using a non-ideal reactor. [3]