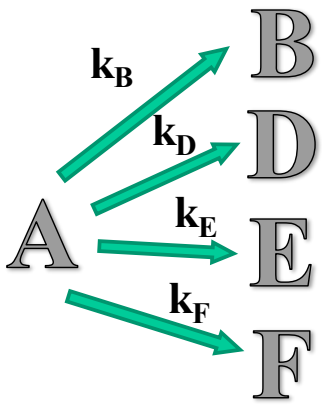
ENCE 650

HOMEWORK #2 -- Fall 2022 Due: **Sept. 13**

The reaction of chemical **A** is being investigated. **A** can react to 4 different products via four independent reactions.



Reaction	Reaction Order	Rate Constant	
		Value	Units
B	0	1.2×10^{-6}	mole/(L-min)
D	0	0.8×10^{-6}	mole/(L-min)
E	1	0.021	min^{-1}
F	2	52	L/(mole-min)

1. The reaction of **A** is evaluated in a batch reactor. The initial concentration of A is 10^{-3} M. Plot the concentration of **A** in the reactor as a function of time, up to 80 minutes. Find the concentration of **A** at 80 minutes.

2. A compound that shuts down Reaction F is added to the reactor; the other reactions are unaffected. Plot the concentration of **A** in the batch reactor as a function of time on the same plot as Problem #1. Find the concentration of **A** at 80 minutes.

3. Discuss the differences in the two plots and why/how they appear as they do.

4. The reaction of **A** is evaluated in a steady state CMFR, volume of 1000 L, flow rate of 20 L/min, influent = 10^{-3}M **A** only. Find the steady state concentrations of **A**, **B**, **D**, **E**, and **F** in the reactor effluent using the rate constants in the table above.

5. Discuss your results from Problems #4.

6. What value of k_B is necessary to keep the concentration of **B** below 5×10^{-5} M in the effluent of Problem #4?