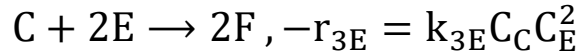
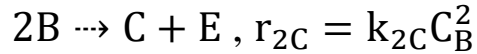
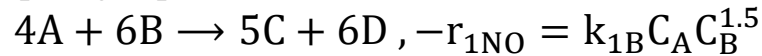


Q: The following complex gas-phase reactions

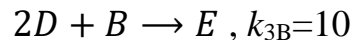
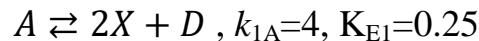


and take place isothermally in a PBR. The feed is equimolar in A and B with $F_{A0} = 10$ mol/min and the volumetric flow rate is 100 dm³/min. The catalyst weight is 100 kg, the pressure drop is $\alpha = 0.005$ kg⁻¹, and the total entering concentration is $C_{T0} = 0.2$ mol/dm³.volume). $k_{1B}=100$, $k_{2C}=1500$, and $k_{3E}= 350$. C and E are desired and other *products* are undesired.

$$\frac{dp}{dx} = -\frac{\alpha}{2p} \left(\frac{F_T}{F_{T0}} \right)$$

- What is the optimum catalyst weight?
- What is the maximum overall yield?
- Write the polymath code.

Q: Consider the following elementary and isothermal liquid-phase reactions:



Take place in a batch reactor. $C_{A0}=0.1$ mol/dm³

- Estimate the optimum reaction time if B is a desired product and other products are undesired products.
- Do you think adding 0.05 mol /dm³ of both C_{X0} and C_{D0} will affect the selectivity value and the required time of reaction (answer by comparing results before and after the change)

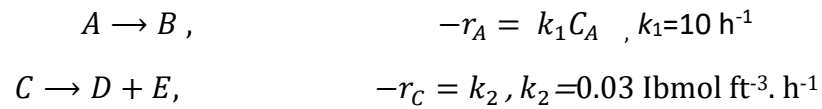
All equilibrium and rate constants are estimated at mole, dm³, and hour units.
Assume the final value time in polymath solution is 10 hours.

Note (how to answer)

- Write the Polymath solution-branch (a) (10Marks), and
- Write the required answers (30 Marks-10 for (a) and 20 for (b)).

CRDII Q BANK

Q: Two gas-phase reactions are occurring in a plug-flow reactor, which is operated isothermally at a temperature of 440°F and a pressure of 5 atm.



The feed, which is equimolar in A and C, enters at a flow rate of 10 lbmol/h. What reactor volume is required for a 50% conversion of A to B? $R = 0.73 \text{ ft}^3 \cdot \text{atm} / ^\circ\text{R} \cdot \text{lbmol}$