HW#6

(a) When α increases, the pressure drop increases and the production decreases. When the pressure drop becomes large, you need to increase reactor volume to have the same conversion.

](b) V=12000 L to produce a molar flow of benzene (C6) that is 50% of the inlet C11 molar flow.

$$W = 12000L \times (1-0.35) \times 4\frac{g}{cm^3} \times \frac{cm^3}{0.001L}\frac{kg}{1000g} = 31200kg$$

α	V (L)	W (kg)
0	12000	31200
0.0001	12418	32287
0.0002	12793	33262
0.0003	13232	34403
0.0004	13754	35760

(c) C6=0.265 mol/l

P=0.35Po=22.75 atm

➔ α =0.00065 for V = 15550 L

(d)

The following table has the flow rates of C6 when the initial volumetric flow rate is doubled, kept the same and halved.

Flow Rate (mol/sec)	**Volume(L)**	**C6 (mol/sec)**	**Pressure (atm)**
Doubling	12000	185	26.1
Initial	12000	223	26.1
Halving	12000	183	26.1

By doubling or halving the volumetric flow rate, we see a decrease in the performance of the reactor. We are now producing less of our desired product with a changed flow rate.