Chapter 12 – Practice FRQ

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1. (a)

$$k_p = \frac{[\mathrm{CO}]^2}{[\mathrm{CO_2}]} \tag{1}$$

(b)

$$\begin{aligned} PV = nRT \rightarrow n &= \frac{PV}{RT} \\ n &= \frac{5 \cdot 2}{.0821 \cdot 1160} \\ n &= .105\,[\mathrm{mol}] \end{aligned} \tag{2}$$

(c) i.

	$[\mathrm{CO_2}]$	$[\mathrm{CO}]$
I	5	0
C	-3.37	$2x$
E	1.63	$2x$

$$x = 3.37 \tag{3}$$

$$(5 + 3.37) - 1.63 = 6.74\,[\mathrm{ATM}]$$

ii.

$$\begin{aligned} k_p &= \frac{(6.74)^2}{1.63} \\ k_p &= 27.87 \end{aligned} \tag{4}$$

(d) The catalyst would make no difference. Because the volume is said to be negligible, there would be no difference, as a catalyst only makes a reaction occur more rapidly, rather than generate more or less product. In this manner, the amount of moles, and, therefore, the volume of the gases generated does not change with a catalyst, meaning that the pressure remains the same as well.

(e)

$$\begin{aligned} Q &= \frac{2^2}{2} = 4 \\ 4 &< 27.87 \end{aligned} \tag{5}$$

$\therefore$ CO_2 pressure will decrease, as more CO needs to be generated