(#11-1)

Introduction to Completion vs. Equilibrium

Completion:

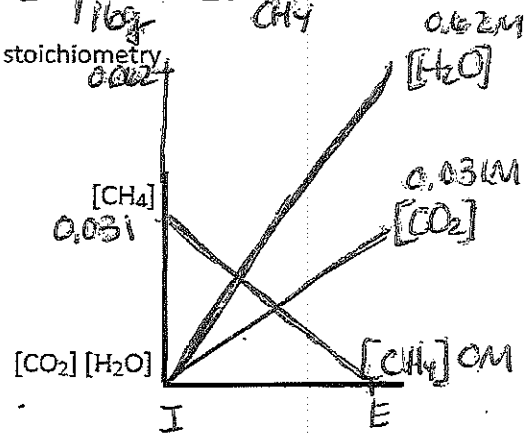
.5 grams of methane burns in excess O_2 to produce CO_2 and H_2O. $0.5g\ CH_4 \frac{1\ mol}{16g} = 0.031\ mol\ CH_4$

Combustion goes to completion.

1. Write a balanced combustion reaction with an ISE table showing stoichiometry.

	CH_4	$+2O_2$	$\rightarrow CO_2$	$+2H_2O$
I	0.031	excess	0	0
S	-0.031	-0.062	+0.031	+0.062
E	0	–	0.031	0.062

2. Draw a graphical representation tracking concentrations:



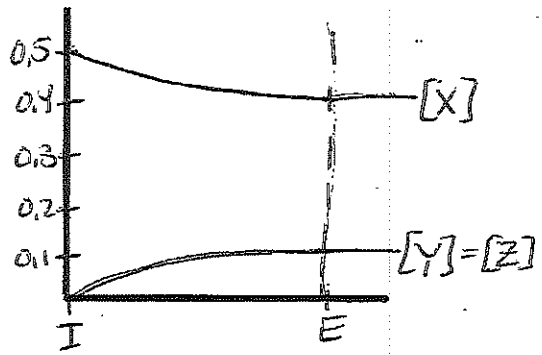
note: O_2 is in excess so we do not have an initial amount of $[O_2]$

3. A Chemical process of .5M of X only goes 20% to product producing Y and Z. Write a balanced reaction with an ISC table showing ISE stoichiometry.

20% of 0.5M = 0.1M

moles (assume 1L)

	$X \leftrightarrow$	$Y +$	Z
I	0.5	0	0
S	-0.1	+0.1	+0.1
E	0.4	0.1	0.1



4. Draw a graphical representation of this process?
   a. Write out the equilibrium expression Kc.
   b. Determine the value of K.

$$K_c = \frac{[Y][Z]}{[X]} = \frac{(0.1M)(0.1M)}{(0.4M)} = 0.025$$

plug in numbers

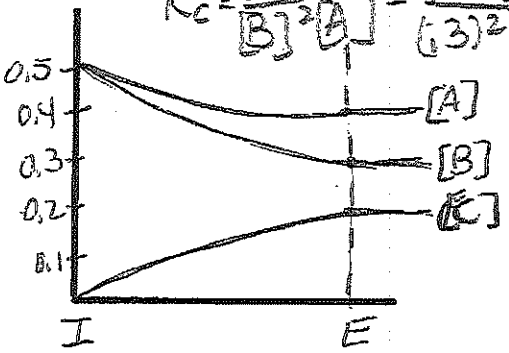
no units (it is a ratio)

A chemical process of $A_{(aq)} + 2B_{(aq)} \leftrightarrow 2C_{(aq)}$ A and B both start at a concentration of .5M and when the process has come to equilibrium 20% of A is converted.

$$K_c = \frac{[C]^2}{[B]^2[A]} = \frac{[0.2]^2}{(.3)^2(.4)} =$$

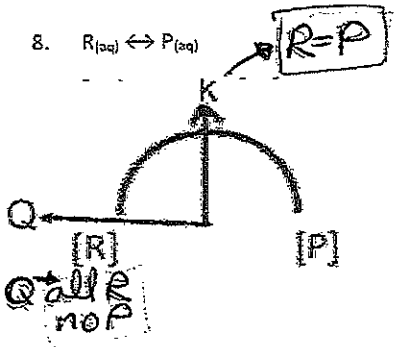
5. Write the equilibrium expression for this reaction.
6. Determine Kc for this process.
7. Draw a graphical representation of concentration.

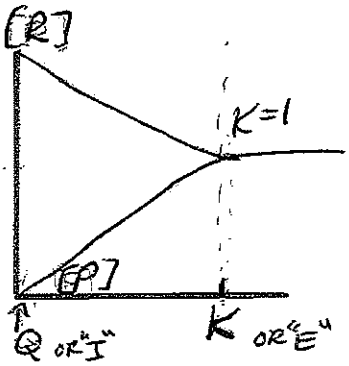
	$A_{(aq)}$	$+2B_{(aq)} \leftrightarrow$	$2C_{(aq)}$
I	0.5	0.5	0
S	-0.1	-0.2	+0.2
E	0.4	0.3	0.2



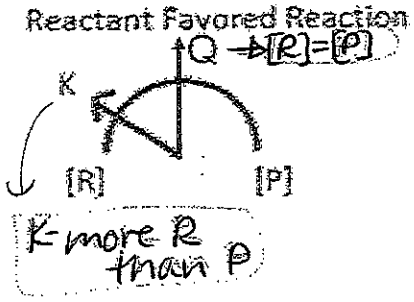
Q: is the reaction not at equilibrium
- could be "I" from ICE table
- Q stands for Quotient

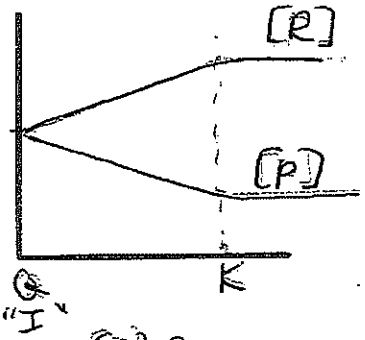
8. $R_{(aq)} \leftrightarrow P_{(aq)}$



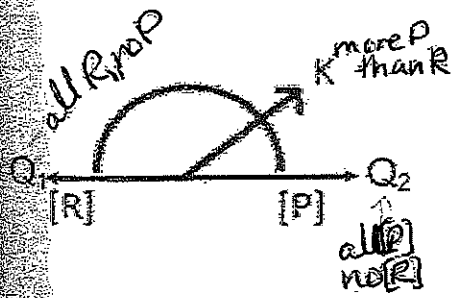


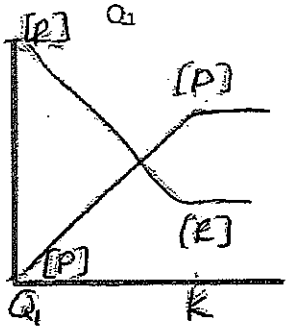
9. $R_{(aq)} \leftrightarrow P_{(aq)}$

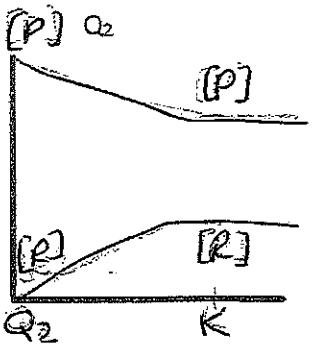




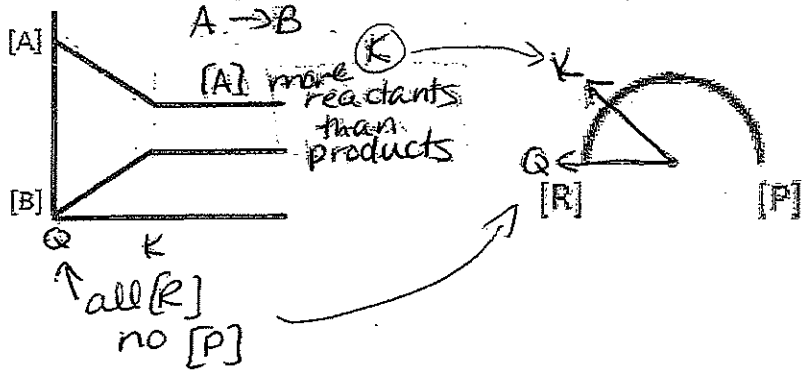
10. $R_{(aq)} \leftrightarrow P_{(aq)}$







11. Using the graph draw an arrow on the gauge indicating placement of equilibrium ratios. Draw an arrow on the graph to the right for both reaction Quotient and K. [A ↔ B]



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