HW04 - Predicting EQ Conc (RICE Tables)

Question 1 — 2.0 pts

Consider the reaction:

$Ni(CO)_4(g) \rightleftharpoons Ni(s) + 4CO(g)$

If the initial concentration of $Ni(CO)_4(g)$ is 1.0 M and x is the equilibrium concentration of CO(g), what is the correct equilibrium relation?

a. $K_c = \frac{4x}{(1.0 - 4x)}$

b. $K_c = \frac{256x^4}{(1.0 - 4x)}$

c. $K_c = \frac{x^5}{(1.0 - \frac{x}{4})}$

d. $K_c = \frac{x^4}{(1.0 - \frac{x}{4})}$

Question 2 — 2.0 pts

Suppose the reaction

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

has an equilibrium constant $K_c = 49$ and the initial concentrations of H_2 and I_2 is 0.5 M and of HI is 0.0M. Which of the following is the correct value for the final concentration of HI(g)?

a. 0.219 M
b. 0.778 M
c. 0.250 M
d. 0.599 M

Question 3 — 2.0 pts

The system

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

is at equilibrium at a fixed temperature with a partial pressure of H_2 of 0.200 atm, a partial pressure of I_2 of 0.200 atm, and a partial pressure of HI of 0.100 atm. An additional 0.26 atm pressure of HI is admitted to the container, and it is allowed to come to equilibrium again. What is the new partial pressure of HI?

a. 0.360 atm
b. 0.464 atm
c. 0.104 atm
d. 0.152 atm

Question 4 — 2.0 pts

At 990°C, $K_c = 1.6$ for the reaction

$H_2(g) + CO_2(g) \rightleftharpoons H_2O(g) + CO(g)$

How many moles of $H_2O(g)$ are present in an equilibrium mixture resulting from the addition of 1.00 mole of H_2, 2.00 moles of CO_2, 0.75 moles of H_2O, and 1.00 mole of CO to a 5.00 liter container at 990°C?

a. 1.1 mol
b. 1.7 mol
c. 0.60 mol
d. 1.0 mol

Question 5 — 2.0 pts

The system

$CO_2(g) + H_2(g) \rightleftharpoons H_2O(g) + CO(g)$

is at equilibrium at some temperature. At equilibrium, a 4.00L vessel contains 1.00 mole CO_2, 1.00 mole H_2, 2.40 moles H_2O, and 2.40 moles CO. How many moles of CO_2 must be added to this system to bring the equilibrium CO concentration to 0.669 mol/L?

a. 0.069 moles
b. 0.498 moles
c. 0.993 moles
d. 0.429 moles

Question 6 — 8.0 pts

To soften the point pain for only 6 (previous) questions, I'm throwing in this super easy 7th one worth 8 points... padding your score.

I've got a tank with a fairly decent pressure of A in it. It reacts according to the reaction shown:

$A(g) \rightleftharpoons B(g)$

After the reaction, half of the A has reacted. What is the value of K_p ?

a. 0.25
b. 2.0
c. 0.5
d. 4.0
e. 1.0