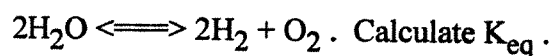


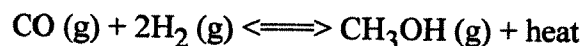
1. In the reaction $A + B \rightleftharpoons C + D$ the $[A]$ and the $[B]$ at the beginning of the reaction are each 1.00 M. When equilibrium is reached 0.600 M "C" is found.
- Calculate K_{eq}
 - using the above reaction find $[D]$ if the final $[A] = 0.500$ M, $[B] = 0.500$ M, $[C] = 1.00$ M.

2. A closed reaction chamber containing PCl_5 was heated to $230^\circ C$ at one atmosphere pressure until equilibrium was reached. Analysis showed the following concentration in the chamber: 0.45 M PCl_5 , 0.096 M Cl_2 , and 0.096 M PCl_3 . Calculate K_{eq} .

3. A 1.00 L container has 18.0 g of water sealed in it and the temperature is raised to $1500^\circ C$. At this temperature 5.00% of the water is decomposed according to the equation:

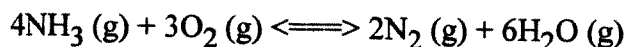


4. Methanol is made according to the equation:

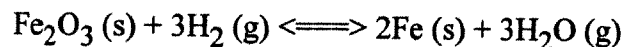


Predict what will happen to K_{eq} with an increase in

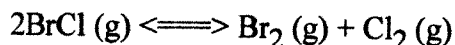
- temperature
 - pressure
5. 2.00 moles of NH_3 and 1.00 moles of O_2 are introduced into an empty 10.0 L vessel. When equilibrium is established, 0.500 moles of N_2 was found. Calculate K_{eq} .



6. At $340^\circ C$, 500.0 g of Fe_2O_3 is placed in contact with 4.00 moles of H_2 gas in a 2.00 L container. 42.5 g of Fe metal is obtained at equilibrium. Find K_{eq} .

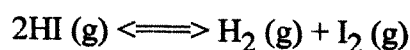


7. 0.397 moles of $BrCl$ are placed in an empty 10.0 L container if $K_{eq} = 1.224 \times 10^{-2}$?
- find $[Br_2]$ at equilibrium
 - how many moles of $BrCl$ dissociate at equilibrium



8. At $1000^\circ C$ the reaction: $I_2 (g) \rightleftharpoons 2I (g)$, $K_{eq} = 0.1650$. If 1.00 mole of iodine was placed in a 100.0 mL flask and heated to that temperature
- find $[I]$ at equilibrium
 - how many moles of I_2 remain undissociated?

9. At 500 °C, HI dissociates according to the equation:



- a.) At equilibrium, the final concentrations are: [hydrogen] = 0.420 M, [iodine] = 0.420 M, [HI] = 3.52 M. Find K_{eq} .
- b.) If an additional 1.00 mol of HI is introduced to a 1.00 L container and equilibrium reestablished, what are the new concentrations of each gas?
10. Using the same equation as number 9, but different conditions $K_{\text{eq}} = 0.0156$. If 1.0 mole of each gas is placed in a 1.0 L container, calculate the final concentration of all components at equilibrium.

-----Answers:

1. a.) 2.25
b.) 0.563 M
2. 0.020
3. 6.93×10^{-5}
4. a.) decrease
b.) no change
5. 18
6. 0.0639
7. a.) 3.60×10^{-3} M
b.) 7.19×10^{-2} moles
8. 1.24 M
0.938 moles
9. a.) 1.42×10^{-2}
b.) 0.516 M, 0.516 M, 4.33 M
10. [HI] = 2.4 M, [hydrogen] = [iodine] = 0.3 M