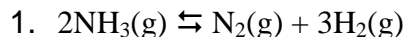
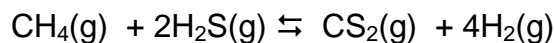


## Equilibrium Worksheet



At 500 K, the following concentrations were measured:  $[\text{N}_2] = 3.0 \times 10^{-2} \text{ M}$ ,  $[\text{H}_2] = 3.7 \times 10^{-2} \text{ M}$ ,  $[\text{NH}_3] = 1.6 \times 10^{-2} \text{ M}$ . What is  $K_c$ ?

2. At 1000 K, the equilibrium partial pressures for the reaction below are:  $\text{CH}_4 = 0.20 \text{ atm}$ ,  $\text{H}_2\text{S} = 0.25 \text{ atm}$ ,  $\text{CS}_2 = 0.52 \text{ atm}$ , and  $\text{H}_2 = 0.10 \text{ atm}$ . What is  $K_p$ ?

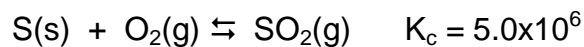
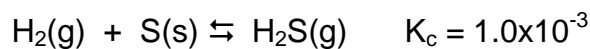


3.  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2 \text{NH}_3(\text{g})$  At 375 °C,  $K_c = 2.79 \times 10^{-5}$ .

a) What is  $K_p$ ?

b) What is  $P_{\text{NH}_3}$  if  $P_{\text{H}_2} = 1.24 \text{ atm}$  and  $P_{\text{N}_2} = 2.17 \text{ atm}$  at equilibrium?

4. Given the equations:



Calculate the value of  $K_c$  for  $\text{H}_2(\text{g}) + \text{SO}_2(\text{g}) \rightleftharpoons \text{H}_2\text{S}(\text{g}) + \text{O}_2(\text{g})$

5. For the reaction,  $\text{B} \rightleftharpoons 2\text{A}$ ,  $K_c = 2$ . Suppose 3.0 moles of A and 3.0 moles of B are introduced into a 2.00 L flask.

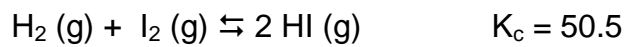
$[\text{A}] =$                        $[\text{B}] =$                        $Q =$

a) Is this system at equilibrium?

b) In which direction will the reaction proceed to reach equilibrium?

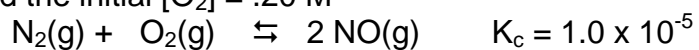
c) As the system moves towards equilibrium, what happens to the concentration of B? A?

6. a) Calculate the equilibrium concentrations of all species for the following reaction if the initial concentrations of  $\text{H}_2$  and  $\text{I}_2$  are both 1.00 M.



- b) For the reaction above, if  $K_p = 50.5$  and the initial pressures are  $\text{HI} = 0.975 \text{ atm}$ ,  $\text{H}_2 = 0.105 \text{ atm}$  and  $\text{I}_2 = 0.105 \text{ atm}$ , what are the equilibrium pressures for all the substances?

7. Calculate the equilibrium concentrations for the reaction below if the initial  $[\text{N}_2] = 0.80 \text{ M}$  and the initial  $[\text{O}_2] = .20 \text{ M}$



6. Calculate the equilibrium concentrations of all species if 3.000 moles of  $\text{H}_2$  and 6.000 moles of  $\text{F}_2$  are placed in a 3.000 L container.

