

Equilibrium Worksheet CHM152. Name: _____

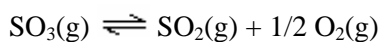
*****SHOW WORK*****

1. Write the expression for K_c for the reaction: $\text{Ag}^+(\text{aq}) + 2 \text{NH}_3(\text{aq}) \rightleftharpoons \text{Ag}(\text{NH}_3)_2^+(\text{aq})$

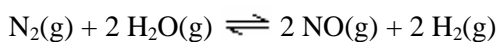
2. Write the expression for K_p for the reaction: $\text{H}_2(\text{g}) + \text{Br}_2(\ell) \rightleftharpoons 2 \text{HBr}(\text{g})$

3. Write the expression for K_p for the reaction: $\text{CO}_2(\text{g}) + \text{CaO}(\text{s}) \rightleftharpoons \text{CaCO}_3(\text{s})$

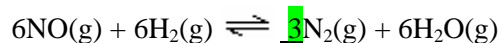
4. For the following reaction, $2 \text{SO}_3(\text{g}) \rightleftharpoons 2 \text{SO}_2(\text{g}) + \text{O}_2(\text{g})$, the equilibrium constant, K_p , is 1.32 at 627°C. What is the equilibrium constant for the reaction below?



5. The equilibrium constant (K_p) for the following reaction is 1.93×10^{-3} at a given temperature.



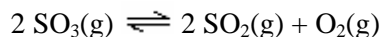
What is the equilibrium constant for the reaction below?



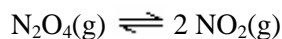
6. Nitrogen dioxide dimerizes to form dinitrogen tetraoxide: $2 \text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g})$

Calculate the value of K_c , given that the gas phase equilibrium constant, K_p , for the reaction is 1.3×10^3 at 273 K. ($R = 0.08206 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$)

7. An equilibrium mixture of SO_3 , SO_2 , and O_2 at 1000 K contains the gases at the following concentrations: $[\text{SO}_3] = 0.41 \text{ M}$, $[\text{SO}_2] = 0.032 \text{ M}$, and $[\text{O}_2] = 0.59 \text{ M}$. What is the equilibrium constant for the decomposition of SO_3 ?



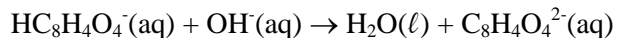
8. We place 0.064 mol $\text{N}_2\text{O}_4(\text{g})$ in a 4.00 L flask at 200. After reaching equilibrium, the concentration of $\text{NO}_2(\text{g})$ is 0.0030 M. What is K_c for the reaction below?



9. Carbonyl bromide decomposes to carbon monoxide and bromine: $\text{COBr}_2(\text{g}) \rightleftharpoons \text{CO}(\text{g}) + \text{Br}_2(\text{g})$

K_c is 0.190 at 73°C. If an initial concentration of 0.330 M COBr_2 is allowed to equilibrate, what are the equilibrium concentrations of COBr_2 , CO , and Br_2 ?

10. Potassium hydrogen phthalate (KHP) is a weak acid that is used to standardize sodium hydroxide according to the net ionic equation below.



If 1.02 g KHP is titrated with 28.34 mL of NaOH, what is the concentration of NaOH?