

Name _____

Period _____

2nd Semester Final Review - Equilibrium

1. Why does a pressure increase on a gaseous equilibrium system favor the reaction that produces fewer gas molecules?
2. Why is removing a product from an equilibrium system as it forms a good way to help maximize the yield of that product?
3. Explain what happens to the rates of the forward and reverse reactions when a reaction system reaches equilibrium.
4. What does K_{eq} tell you about a system at equilibrium?
5. Can the same reaction have different K_{eq} values? Explain?
6. What does a chemical formula in brackets, such as $[N_2O_4]$, represent?
7. What is the K_{eq} expression for the following reaction: $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$.
8. A classmate concludes that reactions with large equilibrium constants are extremely fast. Explain whether the statement is true or false.
9. Predict the effect of each of the following changes on the concentration of N_2O_4 .
 $2NO_2(g) \rightleftharpoons N_2O_4(g) + kJ$
 - a. a decrease in temperature
 - b. an increase in pressure
 - c. addition of $NO_2(g)$
 - d. addition of a catalyst
10. How will the direction of equilibrium shift when the following changes are made?
 $2SO_3(g) + 197 kJ \rightleftharpoons 2SO_2(g) + O_2(g)$
 - a. Oxygen is added?
 - b. The pressure is decreased
 - c.
 - d. The temperature is increased
 - e. Gaseous sulfur dioxide is removed
11. In the presence of a catalyst, methanol, CH_3OH , can be prepared by the reaction of H_2 and CO at high temperatures. $CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$. Write the equilibrium expression for this reaction.
12. What is the concentration of $CH_3OH(g)$ if $[H_2] = 0.08 M$ and $[CO] = 0.025 M$ and the K_{eq} value is 290 at the reaction temperature?
13. For the reaction, $CO_2(g) + H_2(g) \rightleftharpoons CO(g) + H_2O(g)$, equilibrium is established at a certain temperature when the following concentrations are present: $[CO_2] = 0.012 M$, $[H_2] = 0.014 M$, $[CO] = 0.019 M$, and $[H_2O] = 0.019 M$. Calculate the K_{eq} value for this reaction.