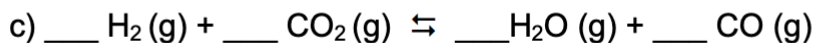
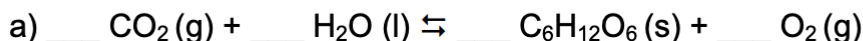
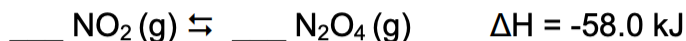


Topic: Chapter 15. Chemical equilibrium (gas phase and aqueous phase; emphasis on LeChatelier's principle)

1. Predict what will happen when the reaction **volume** is **decreased** in each of the following, after balancing the reactions.



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2. Balance, the exothermic reaction below.



Predict the effect of each of the following changes on this system at equilibrium (drive forward reaction, drive reverse reaction, no effect).

a) add N_2O_4

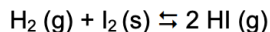
b) remove NO_2

c) increase the volume

d) decrease the temperature

e) Add N_2

-
3. The equilibrium constant, K_p , for the reaction



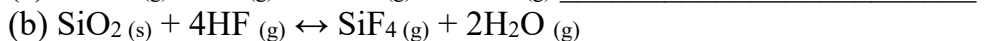
is 0.35 at 25°C . Decide if each of the following mixtures is at equilibrium, at 25°C . If it is not at equilibrium, decide which way the reaction will proceed to reach equilibrium.

a) $P_{\text{H}_2} = 0.10 \text{ atm}$, $P_{\text{HI}} = 0.90 \text{ atm}$ and there is solid I_2 present

b) $P_{\text{H}_2} = 0.55 \text{ atm}$, $P_{\text{HI}} = 0.44 \text{ atm}$, and there is solid I_2 present

c) $P_{\text{H}_2} = 0.25 \text{ atm}$, $P_{\text{HI}} = 0.15 \text{ atm}$ and there is solid I_2 present

4) Predict the effect of **increasing pressure** for each of the following equilibriums:



TOPIC: Chapter 16: Acid-base (definitions, p calculations, salts/neutralization, strength/structure)

- 1) What are the three types of acids/bases and define them.
- 2) Determine the $[\text{OH}^-]$, $[\text{H}_3\text{O}^+]$, pOH and pH of a 0.01 mol/L KOH solution.
- 3) Determine the $[\text{OH}^-]$, $[\text{H}_3\text{O}^+]$, pOH and pH of a 0.045 mol/L HCl solution.
- 4)

What concentration of $\text{Ba}(\text{OH})_2$ is needed to make an aqueous solution of pH 2.75 at 25 °C?

- a. 0.0018 M
- b. 2.4×10^{-6} M
- c. 2.8×10^{-12} M
- d. 5.6×10^{-12} M
- e. 11.25 M

5)

Which of the following solutions are buffered?

- a. 50.0 mL of 0.100 M $\text{NH}_3(\text{aq})$ + 50.0 mL of 0.100 M $\text{NH}_4\text{Cl}(\text{aq})$
 - b. 50.0 mL of 0.100 M $\text{NH}_3(\text{aq})$ + 25.0 mL of 0.100 M $\text{HBr}(\text{aq})$
 - c. 50.0 mL of 0.100 M $\text{HCN}(\text{aq})$ + 50.0 mL of 0.100 M $\text{NaCN}(\text{aq})$
 - d. Both a & c.
 - e. All of a, b & c.
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