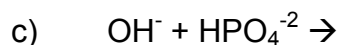


Acid and Base Worksheet

- 1) Using your knowledge of the Brønsted-Lowry theory of acids and bases, write equations for the following acid-base reactions and indicate each conjugate acid-base pair:



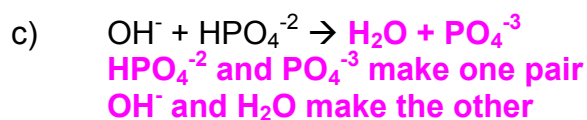
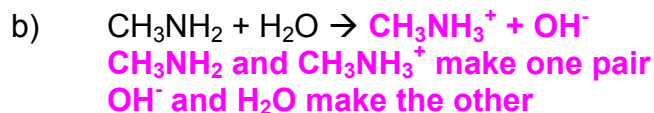
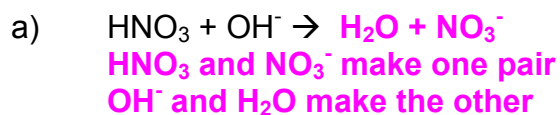
- 2) The compound NaOH is a base by all three of the theories we discussed in class. However, each of the three theories describes what a base is in different terms. Use your knowledge of these three theories to describe NaOH as an Arrhenius base, a Brønsted-Lowry base, and a Lewis base.

- 3) When hydrogen chloride reacts with ammonia, ammonium chloride is formed. Write the equation for this process, and indicate which of the reagents is the Lewis acid and which is the Lewis base.

- 4) Write an equation for the reaction of potassium metal with hydrochloric acid.
- 5) Borane (BH_3) is a basic compound, but doesn't conduct electricity when you dissolve it in water. Explain this, based on the definitions of acids and bases that we discussed in class.
- 6) Write the names for the following acids and bases:
- a) KOH _____
 - b) H_2Se _____
 - c) $\text{C}_2\text{H}_3\text{O}_2\text{H}$ _____
 - d) $\text{Fe}(\text{OH})_2$ _____
 - e) HCN _____
- 7) Write the formulas for the following chemical compounds (remember, you've still got a pop quiz coming up before the end of next week!)
- a) ammonium sulfate _____
 - b) cobalt (III) nitride _____
 - c) carbon disulfide _____
 - d) aluminum carbonate _____
 - e) chlorine _____

Acid and Base Worksheet - Answers

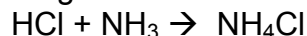
1) Using your knowledge of the Brønsted-Lowry theory of acids and bases, write equations for the following acid-base reactions and indicate each conjugate acid-base pair:



2) The compound NaOH is a base by all three of the theories we discussed in class. However, each of the three theories describes what a base is in different terms. Use your knowledge of these three theories to describe NaOH as an Arrhenius base, a Brønsted-Lowry base, and a Lewis base.

- **NaOH is an Arrhenius base because it creates OH⁻ ions when placed in water.**
- **NaOH is a Brønsted-Lowry base because it accepts H⁺ ions from acids.**
- **NaOH is a Lewis base because the lone pairs on the hydroxide ion can be donated to other compounds.**

3) When hydrogen chloride reacts with ammonia, ammonium chloride is formed. Write the equation for this process, and indicate which of the reagents is the Lewis acid and which is the Lewis base.



NH₃ is a Lewis base because it uses its lone pair electrons to pull a hydrogen atom from hydrochloric acid.

HCl is a Lewis acid because it accepts electrons from NH₃ when the H is transferred.

- 4) Write an equation for the reaction of potassium metal with hydrochloric acid.



- 5) Borane (BH_3) is a basic compound, but doesn't conduct electricity when you dissolve it in water. Explain this, based on the definitions of acids and bases that we discussed in class.

Borane is a Lewis base, but a negligibly strong Brønsted-Lowry base.

- 6) Write the names for the following acids and bases:

- a) KOH **potassium hydroxide**
- b) H_2Se **hydroselenic acid**
- c) $\text{C}_2\text{H}_3\text{O}_2\text{H}$ **acetic acid**
- d) $\text{Fe}(\text{OH})_2$ **iron(II) hydroxide**
- e) HCN **hydrogen cyanide or hydrocyanic acid**

- 7) Write the formulas for the following chemical compounds (remember, you've still got a pop quiz coming up before the end of next week!)

- a) ammonium sulfate **$(\text{NH}_4)_2\text{SO}_4$**
- b) cobalt (III) nitride **CoN**
- c) carbon disulfide **CS_2**
- d) aluminum carbonate **$\text{Al}_2(\text{CO}_3)_3$**
- e) chlorine **Cl_2**