

VITCH

Honors Chemistry Unit 7  
HW #4 – Acid Base Conjugate Pairs

For the following reactions, identify the acid, base, conjugate base and the conjugate acid.

1.  $\overset{A}{\text{H}_3\text{O}^+} + \overset{B}{\text{OH}^-} \leftrightarrow \overset{CB}{\text{H}_2\text{O}} + \overset{CA}{\text{H}_2\text{O}}$
2.  $\overset{A}{\text{H}_2\text{S}} + \overset{B}{\text{NH}_3} \leftrightarrow \overset{CB}{\text{HS}^-} + \overset{CA}{\text{NH}_4^+}$
3.  $\overset{A}{\text{H}_3\text{PO}_4} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{H}_3\text{O}^+} + \overset{CB}{\text{H}_2\text{PO}_4^-}$
4.  $\overset{B}{\text{C}_5\text{H}_5\text{N}} + \overset{A}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{C}_5\text{H}_5\text{NH}^+} + \overset{CB}{\text{OH}^-}$
5.  $\overset{B}{\text{H}_2\text{PO}_4^-} + \overset{A}{\text{H}_2\text{PO}_4^-} \leftrightarrow \overset{CA}{\text{H}_3\text{PO}_4} + \overset{CB}{\text{HPO}_4^{2-}}$
6.  $\overset{B}{\text{CO}_3^{2-}} + \overset{A}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{HCO}_3^-} + \overset{CB}{\text{OH}^-}$

Write the products of the following reactions and identify the acid, base, conjugate base and conjugate acid.

7.  $\overset{A}{\text{H}_2\text{O}} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{H}_3\text{O}^+} + \overset{CB}{\text{OH}^-}$
8.  $\overset{A}{\text{H}_2\text{SO}_4} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CB}{\text{HSO}_4^-} + \overset{CA}{\text{H}_3\text{O}^+}$
9.  $\overset{A}{\text{H}_2\text{PO}_4^-} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CB}{\text{HPO}_4^{2-}} + \overset{CA}{\text{H}_3\text{O}^+}$   
OR  
 $\overset{B}{\text{H}_2\text{PO}_4^-} + \overset{A}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{H}_3\text{PO}_4} + \overset{CB}{\text{OH}^-}$
10. Vinegar and water  
 $\overset{A}{\text{HC}_2\text{H}_3\text{O}_2} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CB}{\text{C}_2\text{H}_3\text{O}_2^-} + \overset{CA}{\text{H}_3\text{O}^+}$
11. Nitric acid and water.  
 $\overset{A}{\text{HNO}_3} + \overset{B}{\text{H}_2\text{O}} \leftrightarrow \overset{CB}{\text{NO}_3^-} + \overset{CA}{\text{H}_3\text{O}^+}$
12. Nitrite ion reacting with hydronium. (hint: hydronium is the Brønsted-Lowry acid)  
 $\overset{B}{\text{NO}_2^-} + \overset{A}{\text{H}_3\text{O}^+} \leftrightarrow \overset{CA}{\text{HNO}_2} + \overset{CB}{\text{H}_2\text{O}}$
13. Ammonia and water. (hint: ammonia is the Brønsted-Lowry base)  
 $\overset{B}{\text{NH}_3} + \overset{A}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{NH}_4^+} + \overset{CB}{\text{OH}^-}$
14. Acetate ion and water  
 $\overset{B}{\text{C}_2\text{H}_3\text{O}_2^-} + \overset{A}{\text{H}_2\text{O}} \leftrightarrow \overset{CA}{\text{HC}_2\text{H}_3\text{O}_2} + \overset{CB}{\text{OH}^-}$