Chemistry 12

Brønsted-Lowry Acid-Base Worksheet

Name: Key
Date:
Block:

1. Write the formula for a ***proton***.

   H^+

2. Write the formula for a ***hydrated proton***. ($H_2O + H^+$)

   H_3O^+

3. Write the formula for a ***hydronium*** ion.

   H_3O^+

4. Give the ***Arrhenius*** definition of an ***acid***.

   Any substance that releases H^+ ions in water

5. Give the ***Arrhenius*** definition of a ***base***.

   Any substance that releases OH^- ions in water

6. Give the ***Bronsted-Lowry*** definition of an ***acid***.

   A species that donates protons (H^+) to another species

7. Give the ***Bronsted-Lowry*** definition of a ***base***.

   A species that accepts protons (H^+) from another species

8. Given the equation: $HCO_3^- + H_2S \rightleftharpoons H_2CO_3 + HS^-$

   B A A B

   a) The **acid** on the left side is H_2S

   b) The **base** on the left side is HCO_3^-

   c) The **acid** on the right side is H_2CO_3

   d) The **base** on the right side is HS^-

9. Find the ***conjugate acids*** of each of the following:

   a) HPO_4^{2-} $H_2PO_4^-$

   b) PO_4^{3-} HPO_4^{2-}

   c) HSO_4^- H_2SO_4

   d) NH_3 NH_4^+

   e) $H_2PO_4^-$ H_3PO_4

10. Find the ***conjugate bases*** of each of the following:

a) $H_2PO_4^-$ HPO_4^{2-}

b) H_3PO_4 $H_2PO_4^-$

c) HSO_4^- SO_4^{2-}

d) H_2O OH^-

e) HPO_4^{2-} PO_4^{3-}

11. Give the formulas of a conjugate acid/base pair in which the ***dihydrogen citrate ion is the conjugate base***.

Conjugate acid $H_3C_6H_5O_7$ Conjugate base $H_2C_6H_5O_7^-$

12. Give the formulas of a conjugate acid/base pair in which the ***dihydrogen citrate ion is the conjugate acid***.

Conjugate acid $H_2C_6H_5O_7^-$ Conjugate base $HC_6H_5O_7^{2-}$

13. Is the dihydrogen citrate ion ***amphiprotic***? Explain your answer.

yes because it can act as an acid (donates H^+) or as a base (accepts H^+)

14. Give the correct formulas and names of 4 ***amphiprotic anions***. (Don't forget that anions have a negative charge!)

1. Formula HSO_3^- Name hydrogen sulphite ion

2. Formula $H_2PO_4^-$ Name dihydrogen phosphate ion

3. Formula HCO_3^- Name hydrogen carbonate ion

4. Formula $H_2C_6H_5O_7^{2-}$ Name dihydrogen citrate ion