

Name: Key
 Period: _____

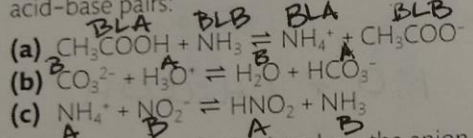
Topic 8.1/8.2 -- Homework set 1
 Reference p. 346-350 in your textbook to complete exercises #1-4 on p. 350

Exercises

- 1 Deduce the formula of the conjugate acid of the following:
- | | | | | | |
|------------------------------|----------------------------|--|-----------------------------------|----------------------|-------------------------|
| (a) SO_3^{2-} | HSO_3^{-} | (c) $\text{C}_2\text{H}_5\text{COO}^-$ | $\text{C}_2\text{H}_5\text{COOH}$ | (e) F^- | HF |
| (b) CH_3NH_2 | CH_3NH_3^+ | (d) NO_3^- | HNO_3 | (f) HSO_4^- | H_2SO_4 |

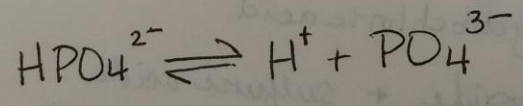
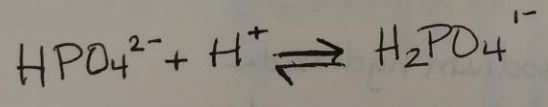
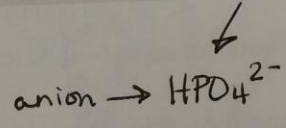
- 2 Deduce the formula of the conjugate base of the following:
- | | | | | | |
|------------------------------|-----------------------------|-----------------------------|--------------------|-------------------|-----------------|
| (a) H_3PO_4 | $\text{H}_2\text{PO}_4^{-}$ | (c) H_2SO_3 | HSO_3^{-} | (e) OH^- | O^{2-} |
| (b) CH_3COOH | $\text{CH}_3\text{COO}^{-}$ | (d) HSO_4^- | SO_4^{2-} | (f) HBr | Br^{-} |

3 For each of the following reactions, identify the Brønsted-Lowry acids and bases and the conjugate acid-base pairs:



→ donate & accept protons
 (amphoteric = base & acid)

4 Show by means of equations how the anion in K_2HPO_4 is amphiprotic.



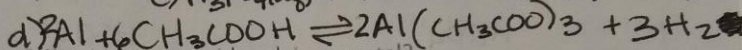
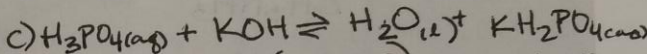
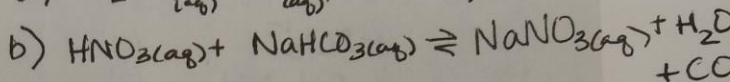
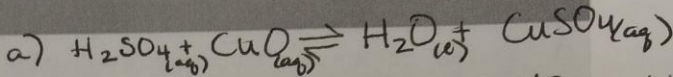
Name: _____
 Period: _____

Reference p. 346-350 in your textbook to complete exercises #5-8 on p. 355

Exercises

5 Write equations for the following reactions:

- (a) sulfuric acid and copper oxide
- (b) nitric acid and sodium hydrogencarbonate
- (c) phosphoric acid and potassium hydroxide
- (d) ethanoic acid and aluminium

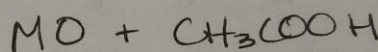


6 An aqueous solution of which of the following reacts with calcium metal?

- A ammonia
- B hydrogen chloride
- C potassium hydroxide
- D sodium hydrogencarbonate

7 Which of the following is / are formed when a metal oxide reacts with a dilute acid?

- I a metal salt
- II water
- III carbon dioxide gas



- A I only
- B I and II only
- C II and III only
- D I, II, and III

8 Suggest by name a parent acid and parent base that could be used to make the following salts. Write equations for each reaction.

- (a) sodium nitrate
- (b) ammonium chloride
- (c) copper(II) sulfate
- (d) potassium methanoate

a) nitric acid + sodium hydroxide

b) ammonia + hydrochloric acid

c) copper (II) hydroxide + sulfuric acid

d) methanoic acid + potassium hydroxide

Name: _____
 Period: _____

Name _____

CONJUGATE ACID-BASE PAIRS

In the exercise, Bronsted-Lowry Acids and Bases, it was shown that after an acid has given up its proton, it is capable of getting back that proton and acting as a base. Conjugate base is what is left after an acid gives up a proton. The stronger the acid, the weaker the conjugate base. The weaker the acid, the stronger the conjugate base.

Fill in the blanks in the table below.

Conjugate Pairs

	ACID	BASE	EQUATION
1.	H_2SO_4	HSO_4^-	$H_2SO_4 \rightleftharpoons H^+ + HSO_4^-$
2.	H_3PO_4	$H_2PO_4^-$	$H_3PO_4 \rightleftharpoons H^+ + H_2PO_4^-$
3.	HF	F^-	$HF \rightleftharpoons H^+ + F^-$
4.	HNO_3	NO_3^-	$HNO_3 \rightleftharpoons H^+ + NO_3^-$
5.	$H_2PO_4^-$	HPO_4^{2-}	$H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{2-}$
6.	H_2O	OH^-	$H_2O \rightleftharpoons H^+ + OH^-$
7.	HSO_4^-	SO_4^{2-}	$HSO_4^- \rightleftharpoons H^+ + SO_4^{2-}$
8.	HPO_4^{2-}	PO_4^{3-}	$HPO_4^{2-} \rightleftharpoons H^+ + PO_4^{3-}$
9.	NH_4^+	NH_3	$NH_4^+ \rightleftharpoons NH_3 + H^+$
10.	H_3O^+	H_2O	$H_3O^+ \rightleftharpoons H_2O + H^+$

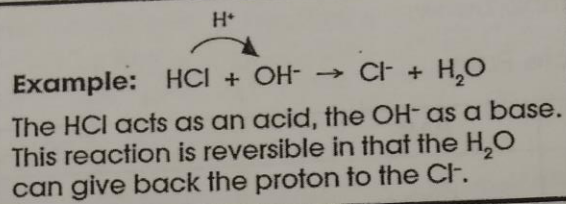
Name: _____

Period: _____

Name _____

BRONSTED-LOWRY ACIDS AND BASES

According to Bronsted-Lowry theory, an acid is a proton (H^+) donor, and a base is a proton acceptor.



Label the Bronsted-Lowry acids and bases in the following reactions and show the direction of proton transfer.

