

## Chapter 16 Worksheet 1

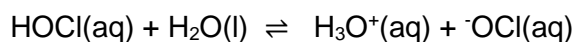
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Instructions:

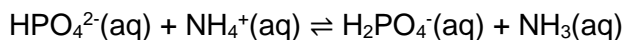
- Please enter your first and last name as it appears on the eLC roster (do not use a nickname).
- Your UGA myID is a combination of letters and numbers (example: mine is wpe28548). **Do not use your 81x number.**
- If you do not have a printer, type your answers in the then upload the worksheet template to Gradescope by Friday, March 19 at 11:59 pm. Write your work on separate sheets of paper, convert to a PDF and upload to eLC.
- If you have a printer download the worksheet, convert it to a PDF and upload to Gradescope by Friday, March 19 at 11:59 pm. You do not need to upload anything to eLC.

1. In the following reaction, which species are acting like Bronsted-Lowry Acids?



- A. HOCl
- B. H<sub>2</sub>O
- C. H<sub>3</sub>O<sup>+</sup>
- D. OCl<sup>-</sup>
- E. None of these

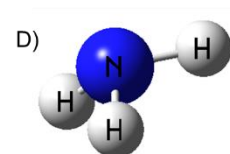
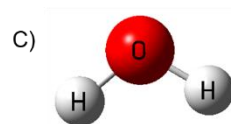
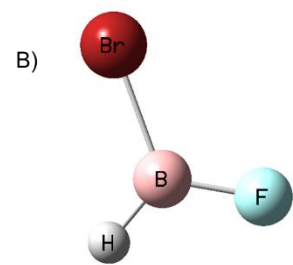
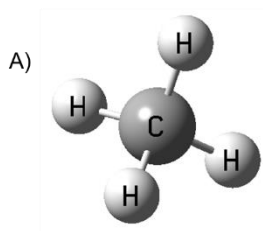
2. In this reaction, which species are acting like Bronsted-Lowry Bases?



- A. NH<sub>3</sub>
- B. HPO<sub>4</sub><sup>2-</sup>
- C. NH<sub>4</sub><sup>+</sup>
- D. H<sub>2</sub>PO<sub>4</sub><sup>-</sup>
- E. None of these

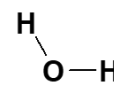
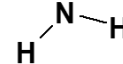
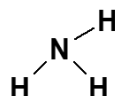
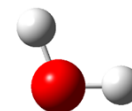
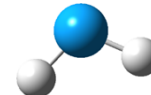
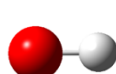
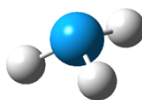
3. Which of these are the best examples of Lewis bases?

- A. B only.  
 B. C only.  
 C. C and D only.  
 D. A, C and D only.  
 E. None of these are Lewis bases.



4. In the reaction depicted below, which species are acids?

- A.  $\text{NH}_3$ ,  $\text{H}_2\text{O}$   
 B.  $\text{NH}_3$ ,  $\text{NH}_2^-$   
 C.  $\text{HO}^-$ ,  $\text{NH}_2$   
 D.  $\text{OH}^-$ ,  $\text{H}_2\text{O}$   
 E.  $\text{NH}_3$ ,  $\text{OH}^-$



5A. The solution labeled A is \_\_\_\_.

- A. Acidic B. Basic C. Neutral

B. The solution labeled C is \_\_\_\_.

- A. Acidic B. Basic C. Neutral

C. Based on the data in this table, which, if any, of these expressions is a constant?

- A.  $[\text{H}_3\text{O}^+] + [\text{OH}^-]$  B.  $\frac{[\text{H}_3\text{O}^+]}{[\text{OH}^-]}$   
 C.  $[\text{H}_3\text{O}^+] - [\text{OH}^-]$  D.  $[\text{H}_3\text{O}^+] \times [\text{OH}^-]$

**Characteristics of solutions of various amounts of hypochlorous acid, HOCl, dissolved in water to make 1.00 L of solution at 25°C**

	Moles of HOCl added	$[\text{H}_3\text{O}^+]$	$[\text{OH}^-]$
A	0.00	$1.0 \times 10^{-7}$	$1.0 \times 10^{-7}$
B	0.30	$9.3 \times 10^{-5}$	$1.1 \times 10^{-10}$
C	0.75	$1.5 \times 10^{-4}$	$6.8 \times 10^{-11}$
D	1.00	$1.7 \times 10^{-4}$	$5.9 \times 10^{-11}$

6. What is the formula of the conjugate base of the Brønsted-Lowry acid  $\text{HPO}_4^{2-}$ ?

7. Write a balanced equation for the dissociation of the Brønsted-Lowry acid  $\text{HSO}_4^-$  in water.

A. What is the formula of the acid?

B. What is the formula of the base?

C. What is the formula of the conjugate acid?

D. What is the formula of the conjugate base?

8. Calculate the hydronium ion concentration in an aqueous solution that contains  $2.50 \times 10^{-4} \text{ M}$  in hydroxide ion.

M

Calculate the pH for an aqueous solution of pyridine that contains  $2.15 \times 10^{-4} \text{ M}$  hydroxide ion.

9. A solution with a hydrogen ion concentration of  $3.25 \times 10^{-2} \text{ M}$  is  and has a hydroxide concentration of .

10. Which of the following indicates the most basic solution?

A.  $[\text{H}^+] = 1 \times 10^{-10} \text{ M}$

B.  $\text{pOH} = 6.7$

C.  $[\text{OH}^-] = 7 \times 10^{-5} \text{ M}$

D.  $\text{pH} = 4.2$

11. At the normal body temperature of 37 °C,  $K_w = 2.42 \times 10^{-14}$ . The  $\text{H}_3\text{O}^+$  concentration of normal blood ranges from  $3.5 \times 10^{-8}$  to  $4.5 \times 10^{-8}$ . The  $\text{OH}^-$  concentration of normal blood ranges from  to  , and blood is  (acidic, basic, neutral).

*Match the following.*

- A. proton donor
- B. electron pair acceptor
- C. proton acceptor
- D. electron pair donor
- E. produces protons in aqueous solution
- F. produces hydroxide ions in aqueous solution

12. Arrhenius acid

13. Arrhenius base

14. Brønsted-Lowry acid

15. Brønsted-Lowry base

16. Lewis base

17. Lewis acid