

## Acid Base Pre-Test

Name: \_\_\_\_\_

Date: \_\_\_\_\_

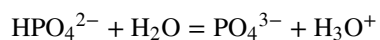
1. In the reaction  $\text{H}_2\text{S} + \text{NH}_3 \rightleftharpoons \text{HNH}_4^+ + \text{HS}^-$ , the two Brønsted bases are

- A.  $\text{NH}_3$  and  $\text{NH}_4^+$       B.  $\text{NH}_3$  and  $\text{HS}^-$   
C.  $\text{H}_2\text{S}$  and  $\text{NH}_3$       D.  $\text{H}_2\text{S}$  and  $\text{HS}^-$

2. According to the Arrhenius theory, a substance that yields hydrogen ions as the only ion in an aqueous solution is

- A. a salt                      B. a base  
C. an acid                     D. a nonelectrolyte

3. What are the two Brønsted acids in the reaction shown?



- A.  $\text{HPO}_4^{2-}$  and  $\text{PO}_4^{3-}$   
B.  $\text{HPO}_4^{2-}$  and  $\text{H}_3\text{O}^+$   
C.  $\text{H}_2\text{O}$  and  $\text{H}_3\text{O}^+$   
D.  $\text{H}_2\text{O}$  and  $\text{PO}_4^{3-}$

4. In the reaction  $\text{NH}_2^- + \text{H}_2\text{O} \rightleftharpoons \text{NH}_3 + \text{OH}^-$ , two Brønsted acids are

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

5. If  $\text{HCl}$  and  $\text{H}_2\text{O}$  react together in an acid-base reaction to form their Brønsted-Lowry conjugates, the products would be

- A.  $\text{HCl}$  and  $\text{H}_3\text{O}^+$       B.  $\text{Cl}^-$  and  $\text{OH}^-$   
C.  $\text{Cl}_2$  and  $\text{H}_2$             D.  $\text{Cl}^-$  and  $\text{H}_3\text{O}^+$

6. Which is the conjugate base of water?

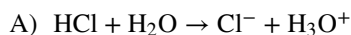
- A.  $\text{H}^+$       B.  $\text{OH}^-$       C.  $\text{H}_3\text{O}^+$       D.  $\text{H}_2\text{O}$

7. According to the Brønsted-Lowry theory, an acid is

- A. a proton donor  
B. a proton acceptor  
C. an electron donor  
D. an electron acceptor

8. In the reaction  $\text{HBr} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{Br}^-$ , which is a conjugate acid-base pair?
- A. HBr and  $\text{Br}^-$                       B. HBr and  $\text{H}_2\text{O}$   
 C.  $\text{H}_3\text{O}^+$  and  $\text{Br}^-$                     D.  $\text{H}_3\text{O}^+$  and HBr
9. In the reaction
- $$\text{NH}_3(\text{g}) + \text{H}_2\text{O}(\ell) \rightleftharpoons \text{NH}_4^+(\text{aq}) + \text{OH}^-(\text{aq}),$$
- which pair are Brønsted bases?
- A.  $\text{NH}_3$  and  $\text{H}_2\text{O}$                       B.  $\text{NH}_3$  and  $\text{OH}^-$   
 C.  $\text{NH}_4^+$  and  $\text{H}_2\text{O}$                       D.  $\text{NH}_4^+$  and  $\text{OH}^-$
10. Unlike an acid, an aqueous solution of a base
- A. causes some indicators to change color  
 B. conducts electricity  
 C. contains more  $\text{H}^+$  ions than  $\text{OH}^-$  ions  
 D. contains more  $\text{OH}^-$  ions than  $\text{H}^+$  ions
11. According to the Arrhenius theory, when an acid substance is dissolved in water it will produce a solution containing only one kind of positive ion. To which ion does the theory refer?
- A. acetate                                      B. hydrogen  
 C. chloride                                      D. sodium
12. According to the Arrhenius theory, a substance that is classified as an acid will always yield
- A.  $\text{H}^+(\text{aq})$                                       B.  $\text{K}^+(\text{aq})$   
 C.  $\text{F}^-(\text{aq})$                                       D.  $\text{I}^-(\text{aq})$
13. Which equation illustrates  $\text{H}_2\text{O}$  acting as a Brønsted-Lowry base?
- A.  $\text{H}^+(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+(\text{aq})$   
 B.  $\text{CH}_3\text{COO}^-(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH}(\text{aq}) + \text{OH}^-(\text{aq})$   
 C.  $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2$   
 D.  $\text{C} + \text{H}_2\text{O} \rightarrow \text{CO} + \text{H}_2$
14. According to the Arrhenius theory, the only negative ions in an aqueous solution of a base are
- A.  $\text{OH}^-$  ions                                      B.  $\text{HS}^-$  ions  
 C.  $\text{H}^-$  ions                                      D.  $\text{HCO}_3^-$  ions

15. Given the reactions A and B:



In which of the reactions can HCl be classified as a Brønsted-Lowry acid?

- A. A, only                      B. B, only  
C. both A and B              D. neither A nor B

16. Which substance is classified as an Arrhenius base?

- A. HCl                          B. NaOH  
C.  $\text{LiNO}_3$                       D.  $\text{KHCO}_3$

17. According to the Brønsted-Lowry theory, an acid is any species that can

- A. donate a proton            B. donate an electron  
C. accept a proton            D. accept an electron

18. According to the Arrhenius theory, when a base is dissolved in water it produces a solution containing only one kind of negative ion. What is the name of this negative ion?

- A. hydrogen carbonate ion  
B. hydrogen sulfate ion  
C. hydride ion  
D. hydroxide ion

19. Which substance can be classified as an Arrhenius acid?

- A. HCl    B. NaCl    C. LiOH    D. KOH

20. Which statement best describes the solution produced when an Arrhenius acid is dissolved in water?

- A. The only negative ion in solution is  $\text{OH}^-$ .  
B. The only negative ion in solution is  $\text{HCO}_3^-$ .  
C. The only positive ion in solution is  $\text{H}^+$ .  
D. The only positive ion in solution is  $\text{NH}_4^+$ .

Acid Base Pre-Test      03/11/2016

1.  
Answer:      B
2.  
Answer:      C
3.  
Answer:      B
4.  
Answer:      C
5.  
Answer:      D
6.  
Answer:      B
7.  
Answer:      A
8.  
Answer:      A
9.  
Answer:      B
10.  
Answer:      D
11.  
Answer:      B
12.  
Answer:      A
13.  
Answer:      A
14.  
Answer:      A
15.  
Answer:      C
16.  
Answer:      B
17.  
Answer:      A
18.  
Answer:      D
19.  
Answer:      A
20.  
Answer:      C