Acids and Bases: Properties & Definitions

1. Which household substance has the **highest** pH?

|  |  |
| --- | --- |
| a | Vinegar |
| b | Ammonia |
| c | Lemon juice  |
| d | Carbonated soft drink |

1. The hydroxide ion concentration in pure water at 25.0 oC is \_\_\_\_\_\_ 

|  |  |
| --- | --- |
| a | 1.0 x 10-14 |
| b | 1.0 x 10-7 |
| c | 1.0 x 107 |
| d | 1. x 1014
 |

1. As a solution becomes more acidic, the pH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| a | decreases and the [OH-(aq)] decreases |
| b | increases and the [OH-(aq)] increases |
| c | decreases and the [H3O+(aq)] decreases |
| d | increases and the [H3O+(aq) ] increases |

1. A hydronium ion (H3O+(aq)) always forms when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | a metallic ion dissolves in water |
| b | a hydrogen ion becomes hydrated |
| c | a base dissolves in water |
| d | an acid reacts with a base |

1. Which of these 0.10 solutions has a pH of 7.00?

|  |  |
| --- | --- |
| a | KCN(aq) |
| b | Na2CO3(aq) |
| c | KCl(aq) |
| d | HF(aq) |

1. Plants are referred to as being either "acid-loving" or "base-loving". A "base-loving" plant would want to be watered with a solution that was

|  |  |
| --- | --- |
| a | High in pH and low in [OH-(aq)] |
| b | High in pH and high in [H3O+(aq)] |
| c | High in pH and low in [H3O+(aq)] |
| d | Low in pH and high in [OH-(aq)] |

1. Adding OH-(aq) drop by drop to a solution of H3O+(aq) would \_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | Generate hydrogen gas |
| b | Decrease the basic properties |
| c | Decrease the amount of H2O(l) |
| d | Decrease the acidic properties |

1. Liquid waste from an industrial plant was found to have a pH of 1.36. Which of the following could be added to the waste to neutralize it?

|  |  |
| --- | --- |
| a | NH3(aq) |
| b | C2H5OH(l) |
| c | NaCl(aq) |
| d | HCl(aq) |

1. As the pH of a solution decreases, the \_\_\_\_\_\_

|  |  |
| --- | --- |
| a | [OH-(aq)] increases |
| b | [H3O+(aq)] increases |
| c | Solution becomes more basic  |
| d | Conductivity of the solution decreases |

1. A solution contains more hydrogen ions than hydroxide ions. Such a solution

|  |  |
| --- | --- |
| a | Is neutral |
| b | Has a high pH |
| c | Is a non-electrolyte |
| d | Turns HPr from red to yellow |

1. "A substance that increases the hydrogen ion concentration" is the

|  |  |
| --- | --- |
| a | Arrhenius definition of an acid |
| b | Bronsted-Lowry definition of an acid |
| c | operational definition of an acid |
| d | Lewis definition of an acid |

1. The Arrhenius definition of an acid states that an acid

|  |  |
| --- | --- |
| a | acts as a proton acceptor |
| b | acts as a proton donor |
| c | releases hydroxide ions in solution |
| d | releases hydrogen ions in solution |

1. An acid is defined as being strong if it

|  |  |
| --- | --- |
| a | Has a high pH |
| b | Has a low [H3O+(aq)] |
| c | Ionizes completely in solution |
| d | Neutralizes a solution of HCl(aq) |

1. In an operational definition of **acids,** one CANNOT say that acids

|  |  |
| --- | --- |
| a | Are bitter to taste and turn HBb to blue |
| b | React with baking soda to produce water |
| c | Are sour to taste and turn HCh to yellow |
| d | React with Mg(s) to produce H2(g)  |

1. Strong acids are strong electrolytes because

|  |  |
| --- | --- |
| a | They dissolve as molecules |
| b | They have a higher pH then do bases |
| c | They have a high percent dissociation |
| d | They have a low Ka value.  |

1. One characteristic property of a strong base is that it

|  |  |
| --- | --- |
| a | Has a sour taste |
| b | Turns H2Tb to blue |
| c | Reacts with Mg(s) to form H2(g) |
| d | Turns HCh to yellow  |

1. Which one of the following statements is valid?

|  |  |
| --- | --- |
| a | A base may react with an acid to produce water |
| b | A weak base ionizes completely in water |
| c | A weak acid does not ionize at all in water. |
| d | An acid ionizes to produce hydroxide ions and water |

1. A 0.0001 solution of nitric acid is best described as

|  |  |
| --- | --- |
| a | A dilute weak acid |
| b | A concentrated strong acid |
| c | A dilute strong acid |
| d | A concentrated weak acid. |

1. A 12.0 solution of CH3COOH(aq) is best described as a

|  |  |
| --- | --- |
| a | A dilute weak acid |
| b | A concentrated strong acid |
| c | A dilute strong acid |
| d | A concentrated weak acid. |

1. A solution conducts electricity well. It has no effect on red or blue litmus and does not react with magnesium metal. The solution could be \_\_\_\_\_\_

|  |  |
| --- | --- |
| a | NaOH(aq) |
| b | NaCl(aq) |
| c | HCl(aq) |
| d | CH3OH(l) |

1. As a solution becomes more acidic, the \_\_\_\_\_\_ will decrease and pH will \_\_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
| a | [H3O+(aq)]  | Increase  |
| b | [H3O+(aq)] | Decrease  |
| c | [OH-(aq)] | Increase  |
| d | [OH-(aq)] | Decrease  |

1. Four solutions of equal concentration were tested for conductivity, reaction with HBb, and reaction with zinc metal. The results were tabulated as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Solution | Conductivity | Reaction with HBb | Reaction with Zn(s) |
| I | Good | Yellow | Produced H2 (g) |
| II | Good | No change | No reaction |
| III | Poor | Yellow | Produced H2 (g) |
| IV | None | No change | No Reaction |

The solution that would be considered to be a solution of a weak acid is\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | I |
| b | II |
| c | III |
| d | IV |

1. A negative pH would be observed in a solution which \_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | [H3O+(aq)] is less than [OH-(aq)] |
| b | [H3O+(aq)] is more than 1.0  |
| c | [H3O+(aq)] is less than 1.0 x 10-6 |
| d | [OH-(aq)] is more than 1.0  |

1. An acid can be described as a substance that\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | Tastes bitter |
| b | Turns HCh to red  |
| c | Increases the pH of the solution |
| d | Reacts with Zn(s) to produce H2(g)  |

1. A solution contains more hydrogen ions than hydroxide ions. Such a solution

|  |  |
| --- | --- |
| a | Is neutral |
| b | Has a high pH |
| c | Is a non-electrolyte |
| d | Turns HPr to yellow |

Solutions:

1. B
2. B
3. A
4. B
5. C
6. C
7. D
8. A
9. B
10. D
11. A
12. D
13. C
14. A
15. C
16. B
17. A
18. C
19. D
20. B
21. D
22. C
23. B
24. D
25. D