Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_\_ Ast: \_\_\_\_\_

**Acids, Bases, and Salts Study Guide**

1. What does pH measure?

*pH measures the ratio of OH- and H30+ ions produced in solution (in water)*

*pH measures the strength of acids and bases (based on the ratio of ions produced)*

1. Explain how the equation “2H2O 🡪 OH- + H3O+” is related to acids and bases.

*When acids and bases are placed in water (in solution), they produce either hydroxide (OH-) ions or hydronium (H30+) ions. This equation shows how these ions are produced when water is broken down.*

1. Which ion do basic (alkaline) substances produce in solution (in water)?

*Bases will produce more hydroxide (OH-) ions in solution.*

1. Which ion do acidic substances produce in solution (in water)?

*Acids will produce more hydronium (H3O+) ions in solution.*

1. How can you use litmus paper and pH paper to determine if a substance is an acid?

*Blue litmus paper will turn red in the presence of an acid. pH paper will indicate a value of less than 7 on the pH scale.*

1. How can you use litmus paper and pH paper to determine if a substance is basic?

*Red litmus paper will turn blue in the presence of a base. pH paper will indicate a value of greater than 7 on the pH scale.*

1. How can you use litmus paper and pH paper to determine if a substance is neutral?

*Neutral substances will not have an effect on either red or blue litmus paper. Both types of paper will retain their original color.*

1. Describe the reactants and product(s) in a neutralization reaction.

*A neutralization reaction involves an acid and a base as reactants. It produces a salt and often water.*

1. What color is salt (any salt, not just table salt)?

*Salts can occur in a variety of colors.*

1. How does salt taste (any salt, not just table salt)?

*Salts can have a variety of tastes, including (but not limited to) salty.*

1. Explain why the reaction, “HCl + NaOH 🡪 NaCl + H2O” is considered a neutralization reaction.

*The reactants are an acid (HCl) and a base (NaOH) and the products include a salt (NaCl) and water (H20).*

1. If a substance tastes bitter and feels slippery, how would you most likely classify it (acid, base, or neutral)?

*This substance is most likely basic (alkaline) because these are common characteristics of bases.*

1. If a substance has a pH of 9 and turns red litmus paper blue, how would you classify it (acid, base, or neutral)?

*This substance is a base because its pH value is higher than 7 and it turns red litmus paper blue, which are both characteristics of basic (alkaline) substances.*

1. If a substance has a pH of 3 and turns blue litmus paper red, how would you classify it (acid, base, or neutral)?

*This substance is an acid because its pH value is lower than 7 and it turns blue litmus paper red, which are both characteristics of acidic substances.*

1. If I tell you a substance is neutral, what pH would you predict it would register with pH paper?

*I would expect this substance to have a pH value of 7, which is the value associated with neutral substances.*

**Use the data in the table below to answer the following questions:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Substance** | **Red Litmus** | **Blue Litmus** | **pH paper** |
| A |  |  | 2.5 |
| B | no change | no change |  |
| C |  |  | 8.5 |
| D | turned blue | no change |  |
| E | no change | no change | 7 |
| F | turned blue | no change | 13 |
| G | no change | turned red | 5 |

1. How would you classify substance E? What evidence do you have to support this claim?

*E – Neutral Neither litmus paper changes color, so it’s not acidic or basic.*

1. How would you classify substance F? What evidence do you have to support this claim?

*F – Basic Its pH is higher than 7 and it turns red litmus paper blue.*

1. There is no data listed for the red or blue litmus paper for substance A. Make a prediction about how each type of paper would react if dipped into substance A. What evidence do you have to support this claim?

*Red litmus paper will not change, but blue litmus paper will turn red. The pH of substance A is lower than 7, indicating that it is an acid, and acids turn blue litmus paper red.*

1. There is no pH value listed for substance B. Predict a value that you would expect to measure for the pH of this substance. What evidence do you have to support this claim?

*Substance B will have a pH of 7. Because neither red or blue litmus paper changed, substance B must be neutral, and neutral substances have a pH value of 7.*

1. There is no data listed for the red or blue litmus paper for substance C. Make a prediction about how each type of paper would react if dipped into substance C. What evidence do you have to support this claim?

*Blue litmus paper will not change, but red litmus paper will turn blue. The pH of substance C is higher than 7, indicating that it is a base, and bases turn red litmus paper blue.*

1. How would you classify substance G? What evidence do you have to support this claim?

*G – Acid Its pH is lower than 7 and it turns blue litmus paper red.*

1. There is no pH value listed for substance D. Make a prediction about the pH value of this substance. What evidence do you have to support this claim?

*Substance D will have a pH somewhere between 7 and 14. Because it turns red litmus paper blue, substance D must be a base, meaning its pH will be above 7.*

1. Which substance(s) would you expect to react with metals and carbonates by producing hydrogen gas bubbles and causing corrosion? What evidence do you have to support this claim?

*Substances A and G are most likely to react with metals and carbonates. This is a characteristic of acids, and substances A and G are acidic based on having a pH lower than 7 or blue litmus paper turning red.*

1. Which substance(s) would you expect to taste sour? What evidence do you have to support this claim?

*Substances A and G are most likely to have a sour taste. This is a characteristic of acids, and substances A and G are acidic based on having a pH lower than 7 or blue litmus paper turning red.*

1. Identify (a) the strongest acid, and (b) the weakest acid listed in the table above. Explain your reasoning.

*Substance A is the strongest acid because it has the lowest pH of all of the substances in the table. Substance G is the weakest acid because it has the highest pH lower than 7 of all the substances in the table. pH values lower than 7 indicate a substance is acidic. pH values closer to zero represent stronger acids while those closer to 7 (but below 7) represent weaker bases.*