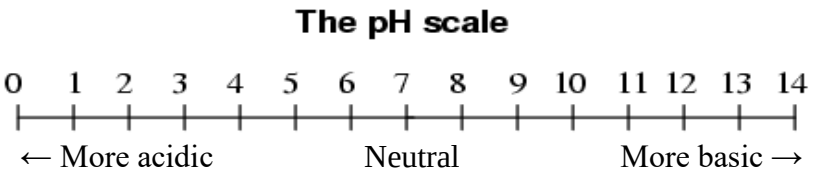
General Biology (BIO 110L)
PRE-LAB 3 : ATOMS & MOLECULES

Name: Jordan Kennedy Date: _____

Acids, Bases, and pH

The degree to which a solution is acidic or basic is represented by a quantity known as pH.
The pH of a solution can be measured by using pH meter, pH Paper and or color indicators.



1. Which of the following values indicates the greater concentration of acid?
pH 5 or pH 2? pH 2 (4 pts)

2. Which of the following values indicates the greater concentration of base?
pH 14 or pH 9 ? pH 14 (4 pts)

3. A student mixes strawberry koolaid and water. A pH meter is used to measure pH of 5.4. What kind of solution is strawberry Koolaid? (2 pts)
A. Acidic B. Basic C. Neutral

4. Bromthymol blue is a chemical indicator that is **blue** in basic solutions, turns **green** in neutral, and turns **yellow** in acidic solutions. (50 pts)

A. What color you think bromthymol blue would be in water directly out of tap (pH 7.2)? Green
B. What color you think bromthymol blue would be in water in which exhaled air is blown through a straw for 5 min and the pH is 5.1? Yellow
C. What color you think bromthymol blue would be in water after a snail has lived in it for three days (pH 5.8)? Yellow
D. What color you think bromthymol blue would be in water after 2mL of bleach has been added to it and the pH is 9.4 ? Blue
E. What color you think bromthymol blue would be in water with instant coffee added to it (pH 5.0)? Yellow

Chemical Reactions

Chemical Reaction: When atoms or molecules interact with each to form new combinations, a chemical reaction takes place.

Ex: $HCl + NaOH \rightarrow NaCl + H_2O$

Hydrochloric acid (HCl) and Sodium hydroxide (NaOH) are REACTANTS. Sodium chloride (NaCl) and Water (H_2O) are the PRODUCTS.

Consider the following reactions and equations:

5. In this reaction $C + O_2 \rightarrow CO_2$, what would be one reactant? C and CO2 (4 pts)

6. $NaCl + AgNO_3 \rightarrow NaNO3 + AgCl$, what would be one product? NaNO3 & AgCl (4 pts)

7. Complete the equation by writing the names of the products. (12 pts)

A. Potassium chloride + Silver nitrate → KNO3 + ClAg

B. Aluminum hydroxide + Sodium nitrate → AlNO3 + OH3NA

8. In the equation …… (20 pts)

$2H_2 + O_2 \rightarrow 2H_2O$

(reactants) (product)

A) How many H atoms are on the left? 2
B) How many H atoms are on the right? 2
C) How many O atoms are on the left? 1
D) How many O atoms are on the right? 2

LAB 3: Atoms & Molecules Lab Report Total points: 100

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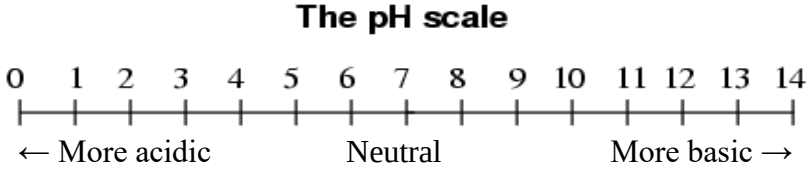
Use the pH scale below to answer the following questions on topics related to Atoms and Molecules.



1. Which of the following values indicates the greater concentration of acid?
pH 1 or pH 4? pH 1 (2 pts)
pH 5 or pH 3? pH 3 (2pts)

2. Which of the following values indicates the greater concentration of base?
pH 8 or pH 10? pH 10 (2 pts)
pH 7 or pH 11? pH 11 (2 pts)

3. What does a pH of 7 indicate? Neutral (4pts)

4. Substances with a pH higher than 7 are considered _____. (4 pts)
a. Acids b. Bases c. Neutral d. Radicals

5. Distilled water with a pH of 7 is: (4 pts)
a. a salt b. a base c. an acid d. neutral

6. Acids have a HIGH pH value. TRUE or FALSE (5 pts)

7. Bromthymol blue is a chemical indicator that is **blue** in basic solutions, turns **green** in neutral, and turns **yellow** in acidic solutions**. Phenolphthalein** is a chemical indicator that is **pink** in basic solutions, and does not react with neutral and acidic solutions to exhibit a color change.

A. When you place 5 drops of Solution A (lemon juice) in a clean test tube and add 2 drops of **Bromthymol Blue** indicator, the color of the lemon juice turns **yellow**. (5pts)

Lemon juice is: a. Acidic b. Basic c. Neutral

B. When you place 5 drops of Solution A (lemon juice) in a clean test tube and add 2 drops of **Phenolphthalein** indicator, the lemon juice turns **cloudy**. There is **no** specific color change. This indicates that lemon juice is **Basic.** (5 pts)

TRUE or FALSE (Circle one).

C. Which reagent (Bromthymol blue or Phenolphthalein) could be considered as an acid indicator? (5 pts) A. Bromthymol blue B. Phenolphthalein

8. Which of the following is considered physical evidence that a reaction took place between 2 substances? (5pts)
a. Color change b. Texture change c. Bubbles forming d. All of these

9. In a chemical reaction, products are found on the _____ side of the equation. (5pts)
a. Right b. Left c. Either d. Both

10. In the following chemical reaction: $NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl$ the reactants are: (5pts)

a. $NaNO_3$ and AgCl b. NaCl and $NaNO_3$ c. NaCl and $AgNO_3$ d. $AgNO_3$ and AgCl

11. In the following chemical reaction: $HCl + NaOH \rightarrow NaCl + H_2O$ the products are: (5pts)

a. HCl and H_2O b. NaOH and NaCl c. NaCl and H_2O d. HCl and NaOH

12. Complete the following equations by writing the **names** of the products. (20pts)

sodium chloride + silver nitrate → Sodium nitrate + silver chloride

sodium iodide + lead nitrate → _____ + _____

13. In the equation …….. (20pts)

$$2C + 2O_2 \rightarrow 2CO_2,$$

A) How many C atoms are on the left? 2
B) How many C atoms are on the right? 2
C) How many O atoms are on the left? 1
D) How many O atoms are on the right? 2