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Name KEY Period \_\_\_\_\_ Date \_\_\_\_\_

**Acid and Bases - Calculations - 2a** Assume complete dissociation.

Please answer each of the following questions. Show all work to receive full credit.

1. A solution of  $1.56 \times 10^{-4}$  M nitric acid is made.

What is the concentration of hydronium?

$$[\text{H}_3\text{O}^+] = 1.56 \times 10^{-4} \text{ M}$$

What is the hydroxide concentration?

$$[\text{OH}^-] = \frac{1 \times 10^{-14}}{1.56 \times 10^{-4}} = 6.41 \times 10^{-11} \text{ M}$$

What is the pH?

$$-\log(1.56 \times 10^{-4}) = 3.81$$

What is the pOH?

$$14 - 3.81 = 10.19$$

2. A  $4.02 \times 10^{-1}$  M solution of sodium hydroxide is made.

What is the concentration of hydronium?

$$[\text{H}_3\text{O}^+] = \frac{1 \times 10^{-14}}{4.02 \times 10^{-1}} = 2.49 \times 10^{-14} \text{ M}$$

What is the hydroxide concentration?

$$[\text{OH}^-] = 4.02 \times 10^{-1} \text{ M}$$

What is the pH?

$$14 - 0.399 = 13.6$$

What is the pOH?

$$-\log(4.02 \times 10^{-1}) = 0.399$$

3. A  $8.51 \times 10^{-7}$  M solution of phosphoric acid is made.

What is the concentration of hydronium?

$$[\text{H}_3\text{O}^+] = 3(8.51 \times 10^{-7}) = 2.55 \times 10^{-6} \text{ M}$$

What is the hydroxide concentration?

$$[\text{OH}^-] = \frac{1 \times 10^{-14}}{2.55 \times 10^{-6}} = 3.92 \times 10^{-9} \text{ M}$$

What is the pH?

$$-\log(2.55 \times 10^{-6}) = 5.59$$

What is the pOH?

$$14 - 5.59 = 8.41$$

4. A  $1.07 \times 10^{-5}$  M solution of magnesium hydroxide solution is made.

What is the concentration of hydronium?

$$[\text{H}_3\text{O}^+] = \frac{1 \times 10^{-14}}{2.14 \times 10^{-5}} = 4.67 \times 10^{-10} \text{ M}$$

What is the hydroxide concentration?

$$[\text{OH}^-] = 2(1.07 \times 10^{-5}) = 2.14 \times 10^{-5} \text{ M}$$

What is the pH?

$$14 - 4.67 = 9.33$$

What is the pOH?

$$-\log(2.14 \times 10^{-5}) = 4.67$$

IL5

Name \_\_\_\_\_

**Elements, Compounds & Mixtures Worksheet**

**Part 1:** Read the following information on elements, compounds and mixtures. Fill in the blanks where necessary.

**Elements:**

- A pure substance containing only one kind of \_\_\_\_\_.
- An element is always uniform all the way through (homogeneous).
- An element \_\_\_\_\_ be separated into simpler materials (except during nuclear reactions).
- Over 100 existing elements are listed and classified on the \_\_\_\_\_.

**Compounds:**

- A pure substance containing two or more kinds of \_\_\_\_\_.
- The atoms are \_\_\_\_\_ combined in some way. Often times (but not always) they come together to form groups of atoms called molecules.
- A compound is always homogeneous (uniform).
- Compounds \_\_\_\_\_ be separated by physical means. Separating a compound requires a chemical reaction.
- The properties of a compound are usually different than the properties of the elements it contains.

**Mixtures:**

- Two or more \_\_\_\_\_ or \_\_\_\_\_ NOT chemically combined.
- No reaction between substances.
- Mixtures can be uniform (called \_\_\_\_\_) and are known as solutions.
- Mixtures can also be non-uniform (called \_\_\_\_\_).
- Mixtures can be separated into their components by chemical or physical means.
- The properties of a mixture are similar to the properties of its components.

**Part 2:** Classify each of the following as elements (E), compounds (C) or Mixtures (M). Write the letter X if it is none of these.

- |                               |   |                    |                |
|-------------------------------|---|--------------------|----------------|
| ___Diamond (C)                | ___Sugar (C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ) | ___Milk            | ___Iron (Fe)   |
| ___Air                        | ___Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )        | ___Gasoline        | ___Electricity |
| ___Krypton (K)                | ___Bismuth (Bi)   | ___Uranium (U)     | ___Popcorn     |
| ___Water (H <sub>2</sub> O)   | ___Alcohol (CH <sub>3</sub> OH)                           | ___Pail of Garbage | ___A dog       |
| ___Ammonia (NH <sub>3</sub> ) | ___Salt (NaCl)  | ___Energy          | ___Gold (Au)   |
| ___Wood                       | ___Bronze   | ___Ink             | ___Pizza       |
| ___Dry Ice (CO <sub>2</sub> ) | ___Baking Soda (NaHCO <sub>3</sub> )                      | ___Titanium (Ti)   | ___Concrete    |



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