

Atoms, Molecules and Ions

Name - _____

1.) Classify each of the following as an atom, molecule or ion.

S^{2-} _____ ion _____

O_2 _____ molecule _____

Sb _____ atom _____

O _____ atom _____

Al^{3+} _____ ion _____

NH_3 _____ molecule _____

2.) A clear glass bottle contains white sand, some nails, salt water with some dye dissolved in it and a layer of gasoline on top. How many phases are present in this system excluding the bottle and lid?

Answer - 6 phases (air on top)

3.) Classify each of the following as heterogeneous or homogeneous.

Diamond _____ homogeneous _____ tree _____ heterogeneous _____ egg _____ heterogeneous _____

4.) If you had 10 g of gold, should you refer to it as an atom or an element?

Answer - element. There is only one type of atom, Au.

5.) In what way are a true solution and a compound similar? In what ways do they differ?

Answer - Similar in that both are homogeneous (composed of one phase). They differ in that a compound is a pure substance and a solution is a mixture of two pure substances.

6.) Which of the following are the possible classifications (element, compound, true solution, or mechanical mixture) for the items listed below? There may be more than one answer for each example.

a.) a clear liquid which can be boiled away to leave a white solid. _____ solution _____

b.) a collection of solid particles, some of which are white and some are red. _____ mechanical mixture _____

c.) a solid which melts at $170^{\circ}C$. _____ element, compound or solid solution _____

d.) a gas. _____ element, compound or solution _____

e.) a liquid. element, compound or solution

f.) a liquid which boils away completely at 136°C. When the liquid is strongly heated in a closed container, a yellow gas and solid are produced. compound or solution

7.) Which of sugar, dirt and air are pure substances and which are mixtures?

Answer - sugar = pure substance dirt = mixture air = mixture

8.) How many phases are present in a regular pencil?

Answer - 5 → wood, graphite, metal, eraser and paint (2 colors).

9.) Classify each of the following as a mixture or a compound.

a.) alcohol ($\text{CH}_3\text{CH}_2\text{OH}$) compound

b.) soda pop mixture

c.) CH_3OH in H_2O mixture

d.) vinegar compound

e.) mini-wheats mixture

f.) pizza mixture

g.) baking soda compound

h.) peanut butter cookies mixture

i.) popcorn with salt and butter mixture

j.) milk mixture