

## Chemistry Review - Matter

- Classify the following as physical or chemical properties:
  - Gold does not tarnish.
  - Gallium melts in your hand.
  - Laughing gas supports combustion.
  - Copper is easily drawn into wires.
- Classify the following as physical or chemical change:
  - Water boils.
  - Nitroglycerine explodes
  - Milk sours.
  - Frost forms on a window
- Classify the following as qualitative or quantitative observations:
  - Potassium reacts vigorously with water
  - The melting point of lithium chloride is  $610^{\circ}\text{C}$ .
  - Magnesium oxide does not dissolve well in water.
  - Beryllium oxide has a density of  $3.01\text{ g/cm}^3$ .
  - Fluorine is a pale yellow gas.
- Complete the following metric conversions:
  - $3.15\text{ m} = \underline{\hspace{2cm}}\text{ cm}$
  - $1630\text{ mL} = \underline{\hspace{2cm}}\text{ L}$
  - $955\text{ Mg} = \underline{\hspace{2cm}}\text{ kg}$
  - $0.0175\text{ m}^3 = \underline{\hspace{2cm}}\text{ cm}^3$
  - $200\text{ dm}^3 = \underline{\hspace{2cm}}\text{ L}$
  - $20\text{ L} = \underline{\hspace{2cm}}\text{ mm}^3$
  - $0.144\text{ kg} = \underline{\hspace{2cm}}\text{ mg}$
  - $23\text{ }\mu\text{m} = \underline{\hspace{2cm}}\text{ m}$
- Explain how you can tell the difference between the following pair of words:
  - mixture/pure substance
  - heterogenous mixture/homogeneous mixture
  - element/compound
  - atom/molecule
- Classify the following substances as either a solution, compound, element, or heterogeneous mixture:
  - sugar : small, white crystals composed of 25 % carbon, 50 % hydrogen, and 25 % oxygen.
  - bird seed: composed of nuts, sunflower seeds, and corn kernels.
  - gold: a shiny, metallic, solid which has a constant temperature during a change of state.
  - salt water: has a variable composition and a single phase.
- Classify the following as heterogeneous or homogeneous
  - a solution of sugar water.
  - a pure sample of silver
  - air (80 % nitrogen gas and 20 % oxygen gas)
  - a mixture of ice and water
- Compare the charges and masses of the subatomic particles.
- How many p, n, and e are found in one atom of each of the following:
  - ${}_{27}^{60}\text{Co}$
  - ${}_{38}^{90}\text{Sr}$
  - ${}_{47}^{108}\text{Ag}$
  - ${}_{82}^{207}\text{Pb}$
  - ${}_{92}^{238}\text{U}$
- Define isotope.
- Draw Bohr-Rutherford diagrams for the following atoms:
  - lithium - 7
  - oxygen - 16
  - niobium - 93
  - gold - 196

12. Name an element that belongs to each of the following groups:  
a) alkali metal      b) transition metal      c) chalcogen      d) halogen

13. Explain why elements in the same group exhibit similar physical and chemical properties.

14. Identify the element with the higher ionization energy:  
a) Mg or Ca      b) Na or Al      c) Cs or Ag      d) Cd or Cl

15. Identify the element with the higher atomic radius:  
a) Mg or Ca      b) Na or Al      c) Cs or Ag      d) Cd or Cl

16. Identify the element with the higher electron affinity:  
a) Mg or Ca      b) Na or Al      c) Cs or Ag      d) Cd or Cl

Answers:

1. a) c   b) p   c) c   d) p      2. a) p   b) c   c) c   d) p

3. a) ql   b) qn   c) qn   d) qn   e) ql

4. a) 315 cm   b) 1.630 L   c) 955 000 kg   d) 17 500 cm<sup>3</sup>   e) 200 L  
f) 20 000 000 mm<sup>3</sup>   f) 144 000 mg   g) 0.000 023 m

5. a) mixture - a combination of two or more kinds of matter, in which each component retains its own characteristics

- changes state over a range of temperatures

pure substance - a material that is composed of only one type of particle

- changes state over a constant temperature

b) heterogeneous mixture - a mixture in which the different components can be distinctly seen

homogeneous mixture - a mixture in which the different components are mixed so that they appear to be a single substance

- a solution

c) element - a pure substance that cannot be broken down by normal chemical means

compound - two or more elements chemically bonded in a fixed ratio

- can be broken down into its constituent elements by chemical means

d) atom - basic unit of an element that still retains the element's properties

molecule - basic unit of a compound that still retains the compound's properties

- two or more atoms chemically bonded in a fixed ratio

6. a) compound      b) heterogeneous mixture      c) element      d) solution

7. a) homogeneous      b) homogeneous      c) homogeneous      d) heterogeneous

8.      Particle              Mass (u)              Charge

        p                      1                      1+

        n                      1                      0

        e                      0.000 83              1-

9. a) 27 p, 27 e, 33 n      b) 38 p, 38 e, 52 n      c) 47 p, 47 e, 61 n

        d) 82 p, 82 e, 125 n      e) 92 p, 92 e, 146 n

10. isotope - a form of an element that is chemically the same but differs in the number of neutrons and thus, different mass

11. a)                      b)                      c)                      d)

12. a) Li, Na, K, etc.      b) Fe, Ag, Au, etc.      c) O, S, Se, etc.      d) F, Cl, Br, etc.

13. All have same number of electrons in the outer shell.

14. a) Mg      b) Al      c) Ag      d) Cl      15. a) Ca      b) Na      c) Cs      d) Cd

16. a) Mg      b) Al      c) Ag      d) Cl