

Chemistry

In-Class Sample Problems

1. a, e and f are compounds. The rest are elements.

2. Not necessarily. The larger compound may be broken up into smaller compounds. You would have to perform further test to be sure.

3. Physical: a, c, e
Chemical: b, d, f

4. Physical: b, c, e
Chemical: a, d

5. **Green** and **solid** are both physical properties. **Colorless** and **gas** (physical properties) and a **brown, shiny solid** that **melts** at 1083°C (all physical). Decomposition is a chemical property (**giving off a gas**). The **brown solid is an element** and the **colorless gas is a compound**.

6. $d = m/V$ $208\text{g}/80.0\text{mL} = 2.60\text{g/mL}$

7. Pumice density = $155\text{g}/163\text{mL} = .951\text{g/mL}$
 $4.56\text{kg} (1,000\text{g}/1\text{kg})(1\text{mL}/.951\text{g}) = 4.79 \times 10^3\text{mL}$
 Pumice will float in water (1.00g/mL) but sink in ethanol (0.790g/mL)

8. Mass in grams: $5.65\text{oz} \cdot (1\text{lb}/16\text{oz}) \cdot (453.6\text{g}/1\text{lb}) = 160.1775\text{g}$
 Water displacement = $33.3\text{mL} - 25.0\text{mL} = 8.3\text{mL}$
 Density = $160.1775\text{g}/8.3\text{mL} = 19.298 = 19\text{g/mL}$
 Yes, it is probably gold.

9. $1\text{g/cm}^3 (1\text{lb}/453.6\text{g})(2.54\text{cm}/1\text{in})^3(12\text{in}/1\text{ft})^3 = 62.4269\dots = 6.243 \times 10^1\text{lb/ft}^3$

10. a,d,e,f = homogeneous
b,c,g,h = heterogeneous

11. Mass % Mg = $(8.75\text{kg})/(8.75\text{kg}+148.21\text{kg}) = 5.57 \times 10^{-2} = \mathbf{5.57\%}$

Mass of Mg = $375\text{g} \cdot (.0557) = 20.8875 = \mathbf{20.9\text{g}}$
 $484\text{kg}/(1-.0557) = 512.5489\dots = \mathbf{513\text{kg}}$

12. Measurement C is the most precise, but B is the most accurate (closest to the actual answer).

13. a. 3 e. 4
b. 2 f. 2
c. 3 g. 2
d. 1 h. 3

14. a. $(157-112)(25.6) = (45 \cdot 25.6) = 1152 = \mathbf{1.2 \times 10^3}$
 b. $35.48-4+0.04 = 31.52 = \mathbf{32}$
 c. $(0.30)(22.42)/(0.03) = 224.2$ since 0.03 has 1 sig fig, the final answer is **200 or 2×10^2**

15. $32.8\text{qt} + 0.12\text{qt} + 3.7\text{qt} + 1.266\text{qt} = 37.886 = \mathbf{37.9\text{qt}}$

16. $\mathbf{9 \times 10^7; 8.7 \times 10^7; 8.70 \times 10^7}$

17. $(0.61 \times 10^{-6}) + (0.11 \times 10^{-4}) + (0.0232 \times 10^{-3})$
 $(0.61 \times 10^{-6}) + (11 \times 10^{-6}) + (23.2 \times 10^{-6})$
 $34.81 \times 10^{-6} = \mathbf{35 \times 10^{-6} \text{ or } 3.5 \times 10^{-5}}$

18. a. $10^{-3}\text{L} = 1\text{mL}$ (milliliter)
 b. $10^{-9}\text{J} = 1\text{nJ}$ (nanojoule)
 c. $10^{-6}\text{g} = 1\mu\text{g}$ (microgram)
 d. $10^2\text{g} = 1\text{hg}$ (hectogram)
 e. $1/100\text{m} = 1\text{cm}$ (centimeter)
 f. $10^{-1}\text{Pa} = \text{dPa}$ (decipascal)

19. a. 12 = 1doz. Exact
 b. 1gal = 3.78L Approximate
 c. 3ft = 1yd Exact
 d. 1.06qt = 1L Approximate
 e. 2.54cm = 1in Exact
 f. 2.2lb = 1kg Approximate

20. $\frac{350\text{km} \cdot (.621\text{mi})}{(1\text{km})} \cdot \frac{(1\text{gal})}{(24.5\text{mi})} \cdot \frac{(\$1.22)}{(1\text{gal})}$
 $= \$10.82314 = \mathbf{\$11}$

21. Using $^{\circ}\text{F} = 9/5\text{ }^{\circ}\text{C} + 32$
 $A = 9/5 A + 32$
 $-4/5 A = 32$ $A = \mathbf{-40^{\circ}}$

22. $\frac{(30.\text{hillala})}{(1\text{Liter})} \cdot \frac{(1\text{ryal})}{(100\text{hillalas})} \cdot \frac{(25\text{cents})}{(1\text{ryal})} \cdot \frac{(1\text{Liter})}{(.265\text{gal})}$
 $= 28.3018\dots = \mathbf{28.3\text{cents/gal}}$