

Assignment 3

Choose/Fill-in the correct answer.

1. A simple way to determine the volume of a flask is to weigh the flask when it is dry and weigh it again when it is filled with water.

The weight of the dry flask = 53.47 grams

The weight of the filled flask = 93.82 grams

Given that the density of water is 0.998 g/mL, calculate the volume of the flask in liters.

(Enter numeric answer here.)

2. A simple way to determine the density of a solid is to immerse the solid in a known quantity of water. When a piece of metal weighing 114 g is placed in a graduated cylinder containing 214 mL of water, the final volume of water read 227.2 mL. Calculate the density (in g/mL) of the metal.

(Enter numeric answer here.)

3. An unknown compound is analyzed. The empirical formula of the compound is determined to be $C_3O_2H_5$. What is the molecular formula of this compound?

- $C_3O_2H_5$
 I don't know, I need to know the percent composition data of the compound.
 I don't know, I need to know the mass of the compound used in the analysis.
 I don't know, I need to know the formula mass of this compound.

4. One mole of hydrogen gas, H_2 ,

- weighs 1.008 grams.
 contains 6.02×10^{23} hydrogen atoms.
 contains 1.20×10^{24} hydrogen atoms.
 weighs 6.02×10^{23} grams.

5. How many carbon atoms are in 7.2 moles of the anti-malarial drug quinine? The chemical formula of quinine is $C_{20}H_{24}N_2O_2$.

- 144 carbon atoms.
 4.33×10^{24} carbon atoms.
 8.67×10^{25} carbon atoms.
 2.39×10^{22} carbon atoms.

6. Calculate the mass of 1.360×10^{24} nickel atoms.

- 25.99 grams
 132.6 amu
 1.252×10^{-26} gram

- 7.985×10^{25} amu

7. Cyclohexane has a molar mass of 84.2 g/mole. Its empirical formula is CH_2 . The molecular formula of cyclohexane is

- CH_2
 C_4H_{36}
 C_5H_{24}
 C_6H_{12}

8. How many formula units are in 45.5 grams of ammonium chloride, NH_4Cl ? (i.e. NH_4Cl is one formula unit).

- 0.851 formula units.
 5.12×10^{23} formula units.
 6.02×10^{23} formula units.
 2.74×10^{25} formula units.

9. Determine the empirical formula of a compound that contains 2.45 grams of silicon combined with 12.4 grams chlorine.

- Si_2Cl_3
 $SiCl_2$
 $SiCl_3$
 $SiCl_4$

10. A solution of Al_2O_3 is 1.47 M. How many moles of O^{2-} ions are in 1.09 milliliters?

(Enter numeric answer here.)

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