

Non Sibi High School

Andover's Chem 300: Accelerated/Honors Chemistry

Chapter 2, Review Quiz 1 Answers

1

Convert the following:

- 0.040 milligrams neon to number of neon atoms
- 7.43×10^{25} magnesium atoms to kilograms magnesium

a.

$$0.040 \text{ mg Ne} \left(\frac{1 \text{ g}}{1000 \text{ mg}} \right) \left(\frac{1 \text{ mol}}{20.18 \text{ g}} \right) \left(\frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} \right) = 1.2 \times 10^{18} \text{ atoms Ne}$$

b.

$$7.43 \times 10^{25} \text{ atoms Mg} \left(\frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left(\frac{24.31 \text{ g}}{1 \text{ mol}} \right) \left(\frac{1 \text{ kg}}{1000 \text{ g}} \right) = 3.00 \text{ kg Mg}$$

2

The density of liquid $\text{C}_2\text{H}_4(\text{NH}_2)_2$ is 0.90 g/mL. What is the volume in liters of 1.08×10^{26} molecules of $\text{C}_2\text{H}_4(\text{NH}_2)_2$?

$$1.08 \times 10^{26} \text{ molecules} \left(\frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} \right) \left(\frac{60.10 \text{ g}}{1 \text{ mol}} \right) \left(\frac{1 \text{ mL}}{0.90 \text{ g}} \right) \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) = 12 \text{ L}$$

3

The density of solid $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ is 1.59 g/cm³. How many molecules are in 75 cm³ of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$? How many carbon atoms are in this sample?

$$75 \text{ cm}^3 \left(\frac{1.59 \text{ g}}{1 \text{ cm}^3} \right) \left(\frac{1 \text{ mol}}{342.3 \text{ g}} \right) \left(\frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \right) = 2.1 \times 10^{23} \text{ molecules}$$

$$2.1 \times 10^{23} \text{ molecules} \left(\frac{12 \text{ C atoms}}{1 \text{ molecule}} \right) = 2.5 \times 10^{24} \text{ C atoms}$$



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