1. Calculate the molar mass of the following substances:
   a. \( \text{Li}_2\text{CO}_3 \)
   b. cadmium
   c. \( \text{CHCl}_3 \)
   d. \( \text{C}_6\text{H}_8\text{O}_6 \)
   e. nitrogen
   f. \( \text{Mg}_3\text{N}_2 \)

2. Calculate the molar mass of a compound if 0.372 moles of it have a mass of 152 g.

3. Tin (II) fluoride \((\text{SnF}_2)\) is often added to toothpaste as an ingredient to prevent tooth decay. What is the mass of F in grams in 24.6 g of the compound?

4. How many atoms are there in 5.10 moles of sulfur?

5. How many moles of cobalt atoms are there in \( 6.00 \times 10^9 \) Co atoms?

6. How many grams of gold are there in 15.3 moles of gold?

7. How many moles of calcium atoms are in 77.4 g of \( \text{Ca} \)?

8. What is the mass in grams of a single atom of each of the following elements:
   a. As
   b. Ni
   c. Hg
   d. Ne

9. What is the mass in grams of \( 1.00 \times 10^{12} \) lead atoms?

10. Zinc (Zn) is a silvery metal that is used in making brass (with copper) and in plating iron to prevent corrosion. How many grams of Zn are in 0.356 mol of Zn?

11. Sulfur (S) is a nonmetallic element that is present in coal. When coal is burned, sulfur is converted to sulfur dioxide and eventually to sulfuric acid that gives rise to the acid rain phenomenon. How many atoms are in 16.3 g of S?

12. How many molecules of ethane \((\text{C}_2\text{H}_6)\) are present in 0.334 g of ethane?

13. Calculate the number of C, H, and O atoms in 1.50 g of glucose \((\text{C}_6\text{H}_{12}\text{O}_6)\), a sugar.

14. A modern penny weighs 2.5 g but contains only 0.063 g of copper (Cu). How many copper atoms are present in a modern penny?

15. Which of the following has a greater mass: 2 atoms of lead, or \( 5.1 \times 10^{-23} \) mole of helium.

16. Which of the following has more atoms: 1.10 g of hydrogen atoms or 14.7 g of chromium atoms?

17. Dimethyl sulfoxide \([\text{(CH}_3\text{)}_2\text{SO}]\), also called DMSO, is an important solvent that penetrates the skin, enabling it to be used as a topical drug-delivery agent. Calculate the number of C, S, H, and O atoms in \( 7.14 \times 10^3 \) g of dimethyl sulfoxide.
18. Pheromones are a special type of compound secreted by the females of many insect species to attract the males for mating. One pheromone has the molecular formula $C_{13}H_{38}O$. Normally, the amount of this pheromone secreted by a female insect is about $1.0 \times 10^{-12}$ g. How many molecules are there in this quantity?

19. The density of water is 1.00 g/mL at 4°C. How many water molecules are present in 2.56 mL of water at this temperature?

20. Which of the following contains the largest number of atoms?
   a. 7.68 g of He
   b. 112 g of Fe
   c. 389 g of Hg