

Molar Problems w/s #4

Block _____

Text readings pages 98-104 (check examples)

A. You are given 35 grams of zinc metal. Calculate the following using the unitary method.

1. The moles of zinc in the 35 g.

$$35\text{g} \times \frac{1 \text{ mole}}{65.39\text{g}} = 5.4 \times 10^{-1} \text{ mol}$$

2. The number of zinc atoms in the 35 g of zinc.

$$35\text{g} \times \frac{6.02 \times 10^{23} \text{ atoms}}{65.39\text{g}} = 3.2 \times 10^{23} \text{ atoms}$$

3. The mass of one atom of zinc.

$$\frac{65.39\text{g/mole}}{6.02 \times 10^{23} \text{ atoms/mole}} = 1.09 \times 10^{-22} \text{ g/atom}$$

B. You are now given 4.1 moles of calcium chloride. Calculate the following using the unitary method.

1. The molar mass of calcium chloride.

$$\text{CaCl}_2 = 40.1 + (35.5)2 = 111.1 \text{ g}$$

2. The mass of 1 molecule of calcium chloride.

$$\frac{111.1 \text{ g}}{6.02 \times 10^{23} \text{ molecules}} = 1.85 \times 10^{-22} \text{ g/molecule}$$

3. The grams of calcium chloride in 4.1 mol.

$$\frac{111.1 \text{ g}}{1 \text{ mole}} \times 4.1 \text{ moles} = 4.6 \times 10^2 \text{ g}$$

4. The number of molecules in 4.1 mol of calcium chloride.

$$\frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} \times 4.1 \text{ moles} = 2.5 \times 10^{24} \text{ molecules}$$

5. The number of atoms of chlorine in the 4.1 mol of calcium chloride.

$$4.1 \text{ mol CaCl}_2 \times \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol CaCl}_2} \times \frac{2 \text{ Cl atoms}}{1 \text{ Ca atom}} = 4.9 \times 10^{24} \text{ atoms of Cl}$$