*Directions*: Show ALL of your work. Make sure to include units!!!!

**Mole-Particle Conversions (use Avogadro’s number for your conversions)**

1. How many moles of magnesium are in 3.01 x 1022 atoms of magnesium?

2. How many glucose molecules are there in 4.00 moles of glucose, C6H12O6?

3. How many moles are 1.20 x 1025 formula units of calcium iodide?

4. How many formula units are in 12.5 moles of calcium phosphate?

# Mole-Mass Conversions (use the molar mass from the periodic table for your conversions)

1. How many moles are in 28 grams of CO2 ?
2. What is the mass of 5 moles of Fe2O3 ?

1. Find the number of moles of argon in 452 g of argon.

4. How many grams are in 3.45 moles of CO2?

# Gram to Particle Conversions (two step conversions using molar mass and Avogadro’s number)

1. How many oxygen molecules are in 3.36 g of oxygen (O2) [2 x mass of O]?

2. Find the mass in grams of 2.00 x 1023 molecules of F2.

3. Determine the number of molecules of 14 g of nitrogen dioxide (NO2).

4. Find the mass, in grams, of 1.00 x 1023 molecules of N2.

5. Aspartame is an artificial sweetener that is 160 times sweeter than sucrose (table sugar) when dissolved in water. It is marketed by G.D. Searle as *Nutra Sweet*. The molecular formula of aspartame is C14H18N2O5 .

a) Calculate the molar mass of aspartame.

b) How many moles are in 10.5 g of aspartame?

c) How many molecules are in 10.5 g of aspartame?

e) How many atoms of nitrogen are in 1.2 grams of aspartame?