Chemical formulas

1. Write a chemical formula of
    a. phosphorous oxide P (group 15) and O (group 16)
    b. arsenic oxide As (group 15) and O (group 16) (consider only *p*-electrons of As)
    c. ammonia N (group 15) and H (group 1)

The Mole

To calculate masses of products and reactants using <u>balanced</u> chemical equations we use a unit called **mole**. One mole of a substance is the amount whose mass equals the molecular or atomic weight (in atomic mass units, amu) of the substance **expressed in grams**. This means that molecular weight of any substance in amu (from periodic table) is equal to molar weight in grams.

E.g. molecular weight of SiO_2 is

28 (molecular weight of Si) + 2x16 (molecular weight of two atoms of O) = 60 amu or molar weight of SiO_2 is 60 g.

A mole of anything has 6.022 x 10^{23} particles. This is called Avogadro's number, after Amedeo Avogadro, who first suggested that equal volumes of gas have equal numbers of molecules.

1. Using atomic masses in periodic table of elements calculate molecular weight (amu) and molar mass (g) for the following substances: NaF, N_2, NaOH, SO_2. How many molecules are in 1 mole of each of these substances?
2. How many moles of oxygen (O_2) are in 128 g of oxygen?