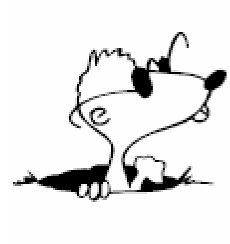
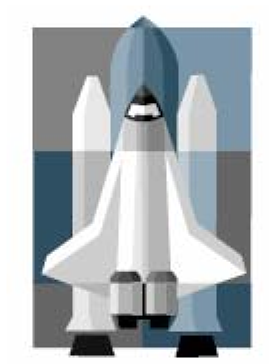
Phys Sc 430
Year-end Review of Moles



1. Two of something is a pair, 12 of something is a dozen, 20 of something is a score, and _______ of something is a *mole.*
2. What is the molar mass of helium? Include the proper unit.
3. What is the molar mass of $Cu(NO_3)_2$?
4. What is the total of the molar masses represented by: $2\ H_2 + O_2$?
5. Find the mass of 3.4 moles of NaBr.
6. How many moles are there in 35.5 g of Cl_2?
7. Determine the simplest formula of a compound containing 37.5% C, 12.5% H, and 50.0% O by mass.
8. Only one isotope of this element exists.

   One atom of this isotope has a mass of 9.123×10^{-23} g. Identify the element.



9. The reusable solid rocket boosters of the U.S. space shuttle use a mixture of aluminum and ammonium perchlorate for fuel:

   $3\ Al_{(s)} + 3\ NH_4ClO_{4(s0} \rightarrow Al_2O_{3(s)} + AlCl_{3(s)} + 3\ NO_{(g)} + 6\ H_2O_{(g)}$

   a. Let's pretend that some engineer calculated that to generate enough thrust we needed to produce 2500 kg of steam [$H_2O_{(g)}$].

   What total mass of solids must react to generate this amount of gas?

   b. How many molecules of water will accompany the release of 132.5 g of $AlCl_3$?

10. When a mixture of silver metal and sulphur is heated, Ag_2S is formed:

    $16\ Ag_{(s)} + S_{8(s} \rightarrow 8\ Ag_2S_{(s)}$

    a. How many moles of silver must react to produce 2 moles of silver (I)sulphide?
    b. What mass of $Ag_2S_{(s)}$ will be produced from mixing a mole of silver with a mole of sulphur?-----What mass of which reactant will be left unreacted?

Answers

1. mole 2. 4.0 g/mole 3. 187.5 g/mole 4. 36 g 5. 350 g
6. 0.500 moles 7. CH4O (based on a total of 100 g, convert each into moles) 8. divide 1 atom by Avogadro's #, to get moles and divide mass by the previous answer to get g/mole…54.9g/mole = Mn
9. 1875 kg + 8160 kg = 10 035 kg 10. a. 4 moles b. 123 g. Do not use 1 mole of sulfur; it's in excess. 240g of it are in excess