

MOLE WORKSHEET #2

1. How many molecules are there in 16.0 grams of barium phosphate ?
2. What is the mass, in grams, of 33 water molecules ?
3. What is the GMM of a substance if 46 molecules have a mass of 3.98×10^{-21} grams ?
4. How many sulphur atoms are there in 0.125 moles of sulphur ?
5. What is the mass of 3.00 moles of sodium sulphate ?
6. How many atoms are there in 7.61 grams of arsenic ?
7. How many nitrogen atoms are there in 0.310 moles of aluminum nitrate ?
8. How many molecules are there in 6.24 grams of N_2O ?
9. How many atoms are there in 7.6 grams of aluminum sulphate ?
10. How many oxygen atoms are there in 18.0 grams of rubidium nitrate ?
11. How many atoms are there in 3 molecules of aluminum chloride ?
12. What is the mass of 0.62 moles of sodium sulphide ?
13. In 7.61 grams of nitrogen gas, how many atoms are present ?
14. In 10 molecules of barium phosphate,
 - a) how many atoms are present ?
 - b) how many oxygen atoms are present ?
15. In 2.00 moles of ammonium nitride,
 - a) how many moles of atoms are present?
 - b) how many atoms are there ?
16. 91.3 grams of lead II oxide contain how many molecules ?
17. 6.24 grams of nitrogen dioxide contain how many
 - a) moles of molecules ?
 - b) moles of atoms ?
 - c) atoms ?
18. How many hydrogen atoms are present in 82.3 grams of ammonium sulphate ?

ANSWERS :

1. 1.60×10^{22} molecules
2. 9.87×10^{-22} grams
3. 52.1 grams/mole
4. 7.53×10^{22} atoms
5. 426 grams
6. 6.12×10^{22} atoms
7. 5.60×10^{23} nitrogen atoms
8. 8.54×10^{22} molecules
9. 2.3×10^{23} atoms
10. 2.20×10^{23} oxygen atoms
11. 12 atoms
12. 48 grams
13. 3.27×10^{23} atoms
14. a) 180 atoms
b) 80 oxygen atoms
15. a) 32.0 moles of atoms
b) 1.93×10^{25} atoms
16. 2.46×10^{23} molecules
17. a) 0.136 moles of molecules
b) 0.407 moles of atoms
c) 2.45×10^{23} atoms
18. 3.00×10^{24} atoms

Molar Mass

$$1. \quad 16.0 \text{ g Ba}_3(\text{PO}_4)_2 \times \frac{1 \text{ mole Ba}_3(\text{PO}_4)_2}{602 \text{ g Ba}_3(\text{PO}_4)_2}$$

Molar mass makes for a great conversion factor between mass (grams) and amount (moles). It is a very common conversion factor in chemistry problems. Use your Periodic Table to add up the Atomic weights of all the atoms in the molecule.

$$16.0 \text{ g Ba}_3(\text{PO}_4)_2 \times \frac{1 \text{ mole Ba}_3(\text{PO}_4)_2}{602 \text{ g Ba}_3(\text{PO}_4)_2} \times \frac{6.02 \times 10^{23} \text{ molecules Ba}_3(\text{PO}_4)_2}{1 \text{ mole Ba}_3(\text{PO}_4)_2}$$

$$= 0.16 \times 10^{23} \text{ molecules}$$

$$= 1.6 \times 10^{22} \text{ molecules Ba}_3(\text{PO}_4)_2$$

$$2. \quad 33 \text{ molecules H}_2\text{O} \times \frac{1 \text{ mole H}_2\text{O}}{6.02 \times 10^{23} \text{ molecules H}_2\text{O}} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mole H}_2\text{O}}$$

$$= 98.7 \times 10^{-23}$$

$$= 9.87 \times 10^{-22} \text{ g}$$