Review for Moles Test

Name: Period: 1 4

1. Determine the molar mass and % composition of each element in the the following compounds:
   1. Potassium cyanide
   2. Cobalt (III) sulfide
   3. Hydrophosphoric acid
   4. Phosphorous acid
   5. Phosphoric acid
   6. Tetraphosphorous decoxide
2. What is the volume of 2.00 × 1019 molecules of tetraphosphorous decoxide gas at STP?
3. What is the mass, in grams, of 3.00 L of carbon dioxide gas at STP?
4. How many formula units are in 4.00 g of potassium cyanide?
5. How many molecules are in 50.0 L of fluorine gas at STP?
6. What is the mass, in grams, of 6.00 × 1020 formula units of cobalt (III) sulfide?
7. What is the volume of 7.00 g of Xenon gas at STP?
8. Cadaverine, a foul smelling substance produced by the action of bacteria on meat, contains 58.55% carbon, 13.81% hydrogen, 27.40% nitrogen by mass. Its molar mass is about 102 g/mol. Calculate its empirical and molecular formulas.
9. Epinephrine (adrenaline), a hormone secreted into the bloodstream in times of danger or stress, contains 59.0% carbon, 7.1% hydrogen, 26.2% oxygen, and 7.7% nitrogen by mass. Its molar mass is about 180 g/mol. Calculate its empirical and molecular formulas.
10. Serotonin is a compound that conducts nerve impulses in the brain. It contains 68.2% carbon, 6.86% hydrogen, 15.9% nitrogen, and 9.08% oxygen by mass. Its molar mass is about 176 g/mol. Determine its empirical and molecular formulas.
11. Write, balance, and determine the type of reaction for the reactions below:
    1. Solid aluminum reacts with chlorine gas to produce solid aluminum chloride.
    2. Liquid ethane burns in the presence of oxygen gas to produce carbon dioxide gas and water vapor.
    3. Solid lead (II) carbonate decomposes when heated to produce lead (II) oxide solid and carbon dioxide gas.
    4. Solutions of lead (II) nitrate and sodium sulfide react to produce a solution of sodium nitrate and a precipitate of lead (II) sulfide.
    5. Solid manganese reacts with nickel (II) chloride solution to produce solid nickel and a solution of manganese (II) chloride.