

UNIT 3 - CHAPTER 3 ASSIGNMENT #1 - KEY

$$1) \frac{500.0 \text{ Atoms Fe}}{6.02 \times 10^{23} \text{ Atoms Fe}} \times \frac{1 \text{ mol Fe}}{55.85 \text{ g Fe}} = 4.639 \times 10^{-20} \text{ g Fe}$$

$$2) \text{ Atoms} \rightarrow \frac{500.0 \text{ g Fe}}{55.85 \text{ g Fe}} \times \frac{1 \text{ mol Fe}}{6.02 \times 10^{23} \text{ Atoms Fe}} = 5.390 \times 10^{24} \text{ Atoms Fe}$$

$$\text{moles} \rightarrow \frac{500.0 \text{ g Fe}}{55.85 \text{ g Fe}} = 8.953 \text{ mol Fe}$$

$$3) a) \text{C}_9\text{H}_8\text{O}_6 \text{ molar mass: } (9 \times 12.01) + (8 \times 1.08) + (4 \times 16) = 180.739 \text{ g/mol}$$

$$b) \text{ MOLES} \rightarrow \frac{500.0 \text{ mg AA}}{1000 \text{ mg AA}} \times \frac{1 \text{ g AA}}{180.739 \text{ g AA}} \times \frac{1 \text{ mol AA}}{6.02 \times 10^{23} \text{ MOLEC. AA}} = 2.767 \times 10^{-3} \text{ mol AA}$$

$$\text{MOLECULES} \rightarrow \frac{500.0 \text{ mg AA}}{1000 \text{ mg AA}} \times \frac{1 \text{ g AA}}{180.739 \text{ g AA}} \times \frac{1 \text{ mol AA}}{6.02 \times 10^{23} \text{ MOLEC. AA}} = 1.665 \times 10^{21} \text{ MOLECULES AA}$$

$$4) a) \frac{5.00 \text{ g C}_2\text{H}_5\text{O}_2\text{N}}{75.1 \text{ g C}_2\text{H}_5\text{O}_2\text{N}} \times \frac{1 \text{ mol C}_2\text{H}_5\text{O}_2\text{N}}{6.02 \times 10^{23} \text{ MOLEC. C}_2\text{H}_5\text{O}_2\text{N}} \times \frac{1 \text{ Atom N}}{1 \text{ MOLEC. C}_2\text{H}_5\text{O}_2\text{N}} = 4.01 \times 10^{22} \text{ Atoms N}$$

$$b) \frac{5.00 \text{ g Mg}_3\text{N}_2}{100.95 \text{ g Mg}_3\text{N}_2} \times \frac{1 \text{ mol Mg}_3\text{N}_2}{6.02 \times 10^{23} \text{ MOLEC. Mg}_3\text{N}_2} \times \frac{2 \text{ Atom N}}{1 \text{ MOLEC. Mg}_3\text{N}_2} = 5.96 \times 10^{22} \text{ Atoms N}$$

$$c) \frac{5.00 \text{ g Ca(NO}_3)_2}{164.1 \text{ g Ca(NO}_3)_2} \times \frac{1 \text{ mol Ca(NO}_3)_2}{6.02 \times 10^{23} \text{ MOLEC. Ca(NO}_3)_2} \times \frac{2 \text{ Atom N}}{1 \text{ MOLEC. Ca(NO}_3)_2} = 3.67 \times 10^{22} \text{ Atoms N}$$

$$d) \frac{5.00 \text{ g N}_2\text{O}_4}{92 \text{ g N}_2\text{O}_4} \times \frac{1 \text{ mol N}_2\text{O}_4}{6.02 \times 10^{23} \text{ MOLEC. N}_2\text{O}_4} \times \frac{2 \text{ Atom N}}{1 \text{ MOLEC. N}_2\text{O}_4} = 6.54 \times 10^{22} \text{ Atoms N}$$

$$5) a) \text{C}_2\text{H}_3\text{Cl}_3\text{O}_2 : (2 \times 12.01) + (3 \times 1.00) + (3 \times 35.45) + (2 \times 16) = 165.379 \text{ g/mol}$$

$$b) \frac{500.0 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2}{165.379 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2} = 3.024 \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2$$

$$c) \frac{2.0 \times 10^{-2} \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2}{1 \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2} \times 165.379 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2 = 3.3 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2$$

$$d) \frac{5.0 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2}{165.379 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2} \times \frac{1 \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2}{6.02 \times 10^{23} \text{ MOLEC. C}_2\text{H}_3\text{Cl}_3\text{O}_2} \times \frac{3 \text{ Atom Cl}}{1 \text{ MOLEC. C}_2\text{H}_3\text{Cl}_3\text{O}_2} = 5.5 \times 10^{22} \text{ Atoms Cl}$$

$$e) \frac{1.0 \text{ g Cl}}{35.45 \text{ g Cl}} \times \frac{1 \text{ mol Cl}}{3 \text{ mol Cl Atoms}} \times \frac{1 \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2}{165.379 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2} = 1.6 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2$$

$$f) \frac{500.0 \text{ MOLECULES C}_2\text{H}_3\text{Cl}_3\text{O}_2}{6.02 \times 10^{23} \text{ MOLEC. C}_2\text{H}_3\text{Cl}_3\text{O}_2} \times \frac{1 \text{ mol C}_2\text{H}_3\text{Cl}_3\text{O}_2}{165.379 \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2} = 1.374 \times 10^{-19} \text{ g C}_2\text{H}_3\text{Cl}_3\text{O}_2$$