

Molar masses: H 1.008, C 12.01, N 14.01, O 16.00, Al 26.98 P 30.97, K 39.10, Mn 54.94 $Cl = 35.45$

Show All Work to Receive Credit.

1. (3 Pts) Determine the number of moles of aluminum in 46.7 g of Al.

$$\frac{46.7 \text{ g}}{26.98 \text{ g/mol}} = 1.730 \text{ mol}$$

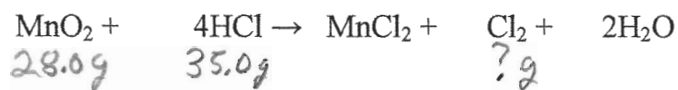
2. (4 Pts) What is the molar mass of acetaminophen, $C_8H_9NO_2$?

$$\begin{array}{l} 2 \times 16.00 = \\ 1 \times 14.01 = \\ 9 \times 1.008 = \\ 8 \times 12.01 = \\ \hline 151.19 \text{ g/mol} \end{array}$$

3. (6 Pts) Complete the following table: (the atomic numbers of C and I are 6 and 53)

isotope	number of protons	number of electrons	number of neutrons
C-13	6	6	7
Iodine-127	53	53	74

4. (10 Pts) How many grams of Cl_2 can be prepared from the reaction of 28.0 g of MnO_2 and 35.0 g of HCl according to the following chemical equation? (atomic masses found on top of page)



Based on MnO_2 :

$$\frac{28.0 \text{ g } MnO_2}{86.94 \text{ g } MnO_2} \times \frac{1 \text{ mol } MnO_2}{1 \text{ mol } MnO_2} \times \frac{1 \text{ mol } Cl_2}{1 \text{ mol } MnO_2} \times \frac{70.90 \text{ g } Cl_2}{1 \text{ mol } Cl_2} = 22.8 \text{ g } Cl_2$$

Based on HCl:

$$\frac{35.0 \text{ g } HCl}{36.46 \text{ g } HCl} \times \frac{1 \text{ mol } HCl}{4 \text{ mol } HCl} \times \frac{1 \text{ mol } Cl_2}{1 \text{ mol } HCl} \times \frac{70.90 \text{ g } Cl_2}{1 \text{ mol } Cl_2} = 17.0 \text{ g } Cl_2$$

HCl is limiting react.

5. (2 Pts) Describe what would happen in a chemical reaction between a metal and a non-metal on the electron level.

The metal will lose e^- (s) to the non-metal

Molar masses: H 1.001, C 12.01, N 14.01, O 16.00, Al 26.98 P 30.97, K 39.10, Mn 54.94 Cl-35.45
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1. (3 Pts) Calculate the number of moles of phosphorus in 12.0 g of phosphorus.

$$\frac{12.0 \text{ g P}}{30.97 \text{ g}} \times \frac{\text{mol}}{1} = 0.3874 \text{ mol} \quad \boxed{0.387 \text{ mol}}$$

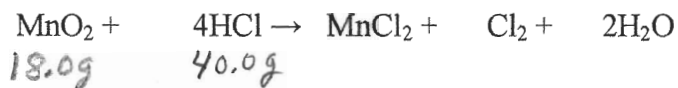
2. (6 Pts) Complete the following table: (the atomic numbers of C and I are 6 and 53)

isotope	number of protons	number of electrons	number of neutrons
Iodine-126	53	53	73
C-14	6	6	8

3. (4 Pts) Calculate the formula mass of potassium permanganate KMnO4.

$$\begin{aligned} & \left[\begin{array}{l} 4 \times 16.00 = 64.00 \\ 1 \times 54.94 = 54.94 \\ 1 \times 39.10 = 39.10 \end{array} \right. \\ & \quad \quad \quad \boxed{158.04 \text{ g/mol}} \end{aligned}$$

4. (10 Pts) How many grams of Cl₂ can be prepared from the reaction of 18.0 g of MnO₂ and 40.0 g of HCl according to the following chemical equation? (atomic masses found on top of page)



18.0g 40.0g

MnO₂ is the limiting reactant.

Based on MnO₂: $\frac{18.0 \text{ g MnO}_2}{86.94 \text{ g MnO}_2} \times \frac{1 \text{ mol MnO}_2}{1 \text{ mol MnO}_2} \times \frac{1 \text{ mol Cl}_2}{1 \text{ mol MnO}_2} \times \frac{70.90 \text{ g Cl}_2}{1 \text{ mol Cl}_2} = \boxed{14.6 \text{ g Cl}_2}$

Based on HCl: $\frac{40.0 \text{ g HCl}}{36.46 \text{ g HCl}} \times \frac{1 \text{ mol HCl}}{4 \text{ mol HCl}} \times \frac{1 \text{ mol Cl}_2}{1 \text{ mol HCl}} \times \frac{70.90 \text{ g Cl}_2}{1 \text{ mol Cl}_2} = 19.4 \text{ g Cl}_2$

5. (2 Pts) Describe what would happen in a chemical reaction between a metal and a non-metal on the electron level.

The metal will lose e⁻ to the non-metal.