

4. (8 points) What is the sodium ion concentration when 100.0mL of 0.250M sodium sulfate is added to 50.0mL of 0.15M sodium nitrate?
5. (15 points) A 1.505g sample containing iron(III)oxide reacted with excess nitric acid to make iron(III)nitrate and water. When the reaction was completed 3.751g of iron(III)nitrate was collected.
- What is the balanced chemical reaction?
 - What is the percent purity of the iron(III)oxide sample? (What is the percent of iron(III)oxide in that sample?)
 - What mass of water was generated in this reaction?

Section 3: Answer two of the following three questions. Be absolutely clear about which questions you are answering. Draw an 'X' through the question that you do not want graded.

9. (10 points) Predict the products, and write the balanced molecular and net ionic equations for both of the following combinations.

a. Ammonium sulfate + barium nitrate →

b. Silver nitrate + sodium carbonate →

10. (10 points) Describe one of the experiments that gave information about the structure of the atom. Be sure to name the scientist, describe the experiment, and what information it provided about the structure of the atom.

11. (10 points) The density of gold is 19.42 g/cm^3 . Give the density in pounds per ft^3 .

NOTE: $1 \text{ kg} = 2.2046 \text{ pounds}$ and $1 \text{ in} = 2.54 \text{ cm}$. Both of these conversions are exact.

Constants and Givens

$$T_K = T_C + 273.15$$

$$T_C = \frac{5}{9}(T_F - 32)$$

Avogadro's Number = 6.022×10^{23}

Solubility Rules

Ions	Statement	Exceptions
$\text{Li}^+, \text{Na}^+, \text{K}^+, \text{NH}_4^+$	Group 1A and ammonium compounds are soluble	N/A
NO_3^-	Nitrates are soluble	N/A
$\text{Cl}^-, \text{Br}^-, \text{I}^-$	Most chlorides, bromides, and iodides are soluble	$\text{Ag}^+, \text{Pb}^{2+}, \text{Hg}_2^{2+}$
SO_4^{2-}	Most sulfates are soluble	$\text{Ca}^{2+}, \text{Sr}^{2+}, \text{Ba}^{2+}, \text{Ag}^+, \text{Pb}^{2+}, \text{Hg}_2^{2+}$
$\text{S}^{2-}, \text{CO}_3^{2-}, \text{CrO}_4^{2-}, \text{PO}_4^{3-}$	Only slightly insoluble or insoluble	Group 1 Cations