

1. Draw the Lewis Dot structures for each of the following: (5 pts)

a. P



b. S²⁻



2. Identify the noble gases that are isoelectronic to the following: (5 pts)

a. Sr²⁺

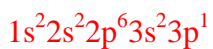
Kr

b. B³⁺

He

3. Write the electron configurations for the following: (5 pts)

a. Al



b. Se



4. Name the following compounds: (5 pts)

a. Fe₂S₃

Iron(III) Sulfide
or
Ferric Sulfide

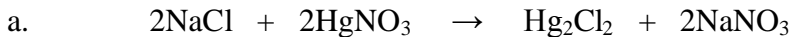
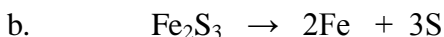
b. Na₃PO₄

Sodium Phosphate

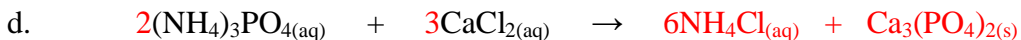
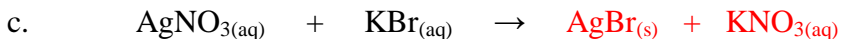
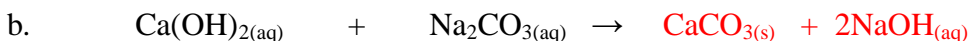
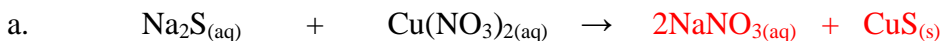
5. Balance the following reactions: (10 pts)



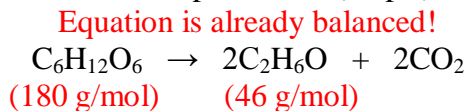
6. Classify the following reactions: (10 pts)

**Double Displacement (Double Replacement)****Decomposition**7. Complete and balance the following reactions and include phase labels, (s), (l), (g), or (aq). (20 pts) **Double Displacement Reactions**

Soluble	Except	Insoluble	Except
$\text{Na}^+, \text{K}^+, \text{Li}^+, \text{NH}_4^+$	None	CO_3^{2-}	Group 1A, NH_4^+
NO_3^-	None	PO_4^{3-}	Group 1A, NH_4^+
$\text{Cl}^-, \text{Br}^-, \text{I}^-$	$\text{Ag}^+, \text{Pb}^{2+}, \text{Hg}^{2+}$	S^{2-}	Group 1A, NH_4^+
SO_4^{2-}	$\text{Ca}^{2+}, \text{Ag}^+, \text{Pb}^{2+}, \text{Ba}^{2+}$	OH^-	Group 1A, Ca^{2+}



8. Fermentation converts sugar into ethanol and carbon dioxide. If you were to ferment a bushel of apples containing 235 g of sugar ($C_6H_{12}O_6$), what is the maximum amount of ethanol (C_2H_6O) in grams that would be produced? (15 pts)



$$235g \times \frac{mol}{180g} \times \frac{2 mol C_2H_6O}{1 mol C_6H_{12}O_6} \times \frac{46g}{mol} = 120g$$

9. Calculate the following: (10 pts) Avogadro's Number = 6.02×10^{23} atoms per mole

a. moles in 2.3×10^{19} atoms of oxygen

b. molecules in 0.23 moles Br_2

$$2.3 \times 10^{19} atoms \times \frac{mol}{6.02 \times 10^{23} atoms} = 3.8 \times 10^{-5} mol$$

$$0.23 moles \times \frac{6.02 \times 10^{23} molecules}{mol} = 1.4 \times 10^{23} molecules$$

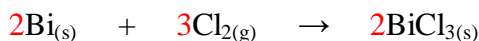
c. molar mass of PI_3

d. grams in 12 moles $NaCl$

412 g/mol

$$12 moles \times \frac{58g}{mol} = 696g$$

10. How many grams of chlorine must react to give 3.52 g of $BiCl_3$? (15 pts)



$$3.52g \times \frac{mol}{314g} \times \frac{3 mol Cl_2}{2 mol BiCl_3} \times \frac{70g}{mol} = 1.18 g Cl_2$$

11. (Extra Credit) List the following in increasing (L to R) ionization energy. (5 pts)

N, Ca, Cl, Fr, Rb

Fr < Rb < Ca < Cl < N