

Name: _____

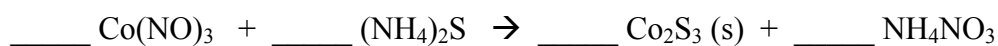
Chem 121
Test 2
Version A

You have 75 minutes to complete this 100 point test. Show all work for full credit. You may use a non-graphing, scientific calculator.

- (5 pts) Fill-in the blank with an appropriate chemical formula
 - _____ is an example of a weak base.
 - _____ is an example of a strong base.
 - _____ is an example of a weak acid.
 - _____ is an example of a strong acid.
 - _____ and a salt are formed in a reaction of a strong acid and a strong base.
- (10 pts) Identify each compound below as soluble (S) or insoluble (IS) in water. If the compound is soluble in water, write the dissociation reaction.

Compound	S or IS	Dissociation Reaction
CaSO ₄		
(NH ₄) ₂ CO ₃		
Fe(NO ₃) ₂		
Cr ₂ O ₃		
Al(C ₂ H ₃ O ₂) ₃		

- (10 pts) Balance the reactions below



4. (15 pts) Write the complete, ionic and net ionic balanced equations for the reaction of manganese(IV) nitrate with lithium carbonate. Don't forget to indicate the precipitate.

Complete: _____

Ionic: _____

Net Ionic: _____

5. (10 pts) Sucrose has a formula of $C_{12}H_{22}O_{11}$.

a. Calculate the molar mass of sucrose

b. There are 3.10×10^4 mg of sucrose in a Snicker's bar. How many molecules of sucrose is this?

6. (10 pts) Doctors recommend soaking sore feet in a solution of Epsom salt, also known as $MgSO_4$.

a. If you want to prepare 2.00 L of the soaking solution with a concentration of 0.500M, how many grams of $MgSO_4$ should you dissolve in water? (MM of $MgSO_4 = 120.37$ g/mol)

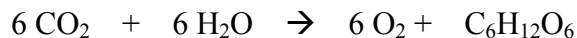
b. What volume of the 0.500M Epsom salt would be needed to make a 2.50L solution with a concentration of 0.300M? (hint: you do not need anything from 6a do complete 6b)

7. (15 pts) Estradiol is a female sexual hormone that causes maturation and maintenance of the female reproductive system. Elemental analysis of estradiol gave the following percent composition: 79.37% C, 8.88% H and 11.75% O.

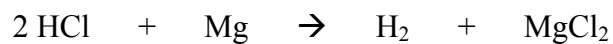
a. Determine the empirical formula of estradiol.

b. If the molar mass of estradiol is 272.37 g/mol, what is the molecular formula of estradiol?

8. (10 pts) In photosynthesis, plants convert carbon dioxide and water into glucose, $C_6H_{12}O_6$. If a plant consumes 37.8 g of CO_2 in a week, what mass of glucose is produced? (MM of $CO_2 = 44.01$ g/mol, MM of $C_6H_{12}O_6 = 180.2$ g/mol)



9. (15 pts) Hydrochloric acid reacts with magnesium metal to form magnesium chloride and hydrogen gas. What mass of hydrogen gas is produced if 0.250L of 0.500M HCl is allowed to react with 125g of Mg? (MM of H₂ = 2.016 g/mol)



10. (10 pts) The titration of a 20.0mL sample of an H₂SO₄ solution of unknown concentration requires 22.87mL of a 0.158 M KOH solution to reach the end point. What is the concentration of the unknown H₂SO₄?

