

Name: \_\_\_\_\_

1. Supply answers to all questions on paper provided.
2. Programmable calculators are permitted only if the proctor has cleared the memory.
3. Partial credit will be limited. All questions are of equal weight.
4. There are 100 points possible for this examination. Your score will be reported as a percentage of 100.

1. Calculate the molecular mass of mercury (II) nitrate.
2. Calculate the number of moles of oxygen atoms in 50.0g of oxygen atoms.
3. Calculate the number of moles of oxygen molecules in 50.0g of oxygen gas.
4. Determine the empirical formula and the molecular formula for a compound that has been analyzed to have 37.8% C, 6.3% H, and 55.8% chlorine. The molecular mass is 127.0g/mol.

Balance the following chemical equations by inspection:

5. barium nitrate + sulfuric acid  $\rightarrow$  barium sulfate + nitric acid
6. ammonium sulfide + mercury (II) bromide  $\rightarrow$  ammonium bromide + mercury (II) sulfide
7. barium + water  $\rightarrow$  barium hydroxide + hydrogen.

Balance the following reaction equations and classify each as a combination reaction, decomposition reaction, single-replacement reaction, double-replacement reaction, or neutralization reaction:

8.  $\text{KNO}_3 (\text{s}) \rightarrow \text{KNO}_2 (\text{s}) + \text{O}_2 (\text{g})$
9.  $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{K}_2\text{SO}_4 \rightarrow \text{PbSO}_4 (\text{s}) + \text{KC}_2\text{H}_3\text{O}_2$ .
10.  $\text{BaCO}_3 + \text{HNO}_3 \rightarrow \text{Ba}(\text{NO}_3)_2 + \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$
11. Calculate the number of grams of oxygen that can be produced by heating 3.50 g of potassium chlorate:  
 $\text{KClO}_3 (\text{s}) \rightarrow \text{KCl} (\text{s}) + \text{O}_2 (\text{g})$
12. The normal dose of the anti-inflammatory ibuprofen is 200mg. Calculate the number of molecules in this dose. The molar mass of ibuprofen is 206 g/mol.

A 36.0 g sample of calcium hydroxide is allowed to react with a 40.5 g sample of phosphoric acid, to produce calcium phosphate and water.

13. Write the balanced chemical equation for this reaction. Instructor will supply answer if necessary for 5 pt. penalty.
14. What is the limiting reactant?
15. How many grams of calcium phosphate can be produced?
16. If 45.2 g of calcium phosphate is actually obtained, what is the percent yield?
17. Calculate the number of moles of excess reagent remaining at the end of the reaction. Identify what the non-limiting reagent is.
18. How much calcium hydroxide is remaining at the end of the reaction?

19. Describe the difference between an exothermic and an endothermic reaction.
20. Describe what a combustion reaction is.