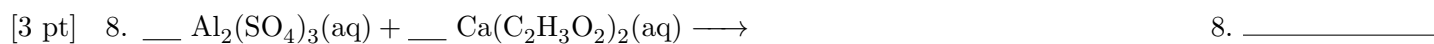
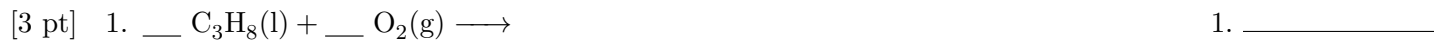


Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Instructions: Answer the following questions. Show ALL work for problems to receive full credit. Make sure to include proper units and significant figures for all answers.**

Complete and balance the following reactions. Indicate the state (solid, liquid or gas) of the products when known. If heat is produced as a product include it. If no reaction occurs write NR in the answer blank.

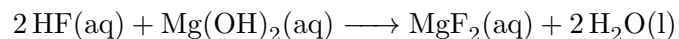


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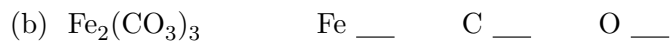
- [6 pt] 9. Define each of the following terms, list what type of molecules have these properties and give an example compound for each.

|                    | <b>Definition</b> | <b>Class of Molecules</b> | <b>Example</b> |
|--------------------|-------------------|---------------------------|----------------|
| Strong Electrolyte |                   |                           |                |
| Weak Electrolyte   |                   |                           |                |
| Non-Electrolyte    |                   |                           |                |

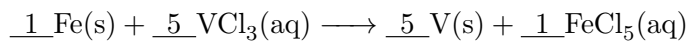
- [4 pt] 10. Write the total ionic equation and the net ionic equation for the following reaction:



- [5 pt] 11. What is the oxidation number of each of the atoms in the following compounds or ions.



- [5 pt] 12. In the following reaction write the oxidation number of each element below it. Determine which element is oxidized and which element is reduced and write it in the answer blank.



Oxidized: \_\_\_\_\_



Reduced: \_\_\_\_\_

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[0 pt] 13. Some useful and not so useful Molecular Weights to save you some time:

|  |  |  |
|--|--|--|
| PbCl <sub>2</sub> = 278.11 g/mol             | NaCl = 58.44 g/mol   | Pb(NO <sub>3</sub> ) <sub>2</sub> = 331.23 g/mol |
| Ca(OH) <sub>2</sub> = 74.10 g/mol            | Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> = 342.11 g/mol | C <sub>2</sub> H <sub>6</sub> = 30.07 g/mol      |
| CO <sub>2</sub> = 44.01g/mol                 | H <sub>2</sub> O = 18.02 g/mol                                 | O <sub>2</sub> = 16.00 g/mol                     |
| H <sub>2</sub> SO <sub>4</sub> = 98.09 g/mol | H <sub>3</sub> PO <sub>4</sub> = 98.00 g/mol                   | NaOH = 40.00 g/mol                               |
| Na = 22.99 g/mol                             | Fe <sub>2</sub> O <sub>3</sub> = 159.70 g/mol                  | Al = 26.95 g/mol                                 |
| Fe = 55.85 g/mol                             | Al <sub>2</sub> O <sub>3</sub> = 101.90 g/mol                  |  |

[4 pt] 14. What is the Molarity of a solution made from 25.0 g of Ca(OH)<sub>2</sub> added to 350.0 mL of 14. \_\_\_\_\_ water?

[4 pt] 15. How many O atoms are in 25.0 g of Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>? 15. \_\_\_\_\_

[4 pt] 16. How many grams of H<sub>2</sub>O can be produced by burning 28.75 grams of C<sub>2</sub>H<sub>6</sub>? 16. \_\_\_\_\_  
2 C<sub>2</sub>H<sub>6</sub>(g) + 7 O<sub>2</sub>(g) → 4 CO<sub>2</sub>(g) + 6 H<sub>2</sub>O(g)

[5 pt] 17. In a titration, it took 115.0 mL of 0.38 M H<sub>3</sub>PO<sub>4</sub> to neutralize 45.0 mL of an unknown 17. \_\_\_\_\_ concentration of Ca(OH)<sub>2</sub>. What is the concentration of the Ca(OH)<sub>2</sub> solution?  
2 H<sub>3</sub>PO<sub>4</sub>(aq) + 3 Ca(OH)<sub>2</sub>(aq) → 1 Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>(aq) + 6 H<sub>2</sub>O

[5 pt] 18. Relax, take a break. Imagine yourself on you dream vacation doing something amazing. Tell me where you are and what you are doing? (Then get back to work you slackers!)

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[5 pt] 19. Your 3.00 g "sample" of cocaine is cut with NaCl. To determine the percentage impurity 19. \_\_\_\_\_ you react your "sample" with  $\text{Pb}(\text{NO}_3)_2$  to produce 5.30 g of  $\text{PbCl}_2$  precipitate. What is the percentage of NaCl in your cocaine?

[8 pt] 20. An unknown hydrocarbon ( $\text{C}_x\text{H}_y$ ) was combusted to produce 22.72 g  $\text{CO}_2$  and 11.62 g of  $\text{H}_2\text{O}$ . The molecular weight of the original compound is 58.119 g/mol.

(a) What is the percentage of Carbon? 20(a) \_\_\_\_\_

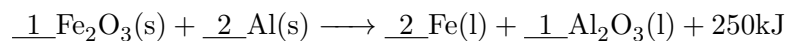
(b) What is the percentage of Hydrogen? 20(b) \_\_\_\_\_

(c) What is the Empirical Formula of the compound? 20(c) \_\_\_\_\_

(d) What is the Molecular Formula of the compound? 20(d) \_\_\_\_\_

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[21 pt] 21. You perform a reaction in lab starting with 50.0 g of  $\text{Fe}_2\text{O}_3$  and 75.0 g Al. Show all calculations in the space provided.



- (a) What is the limiting reactant? 21(a) \_\_\_\_\_
- (b) How many grams of the excess reagent will be left over? 21(b) \_\_\_\_\_
- (c) What is the theoretical yield in grams of Fe in grams? 21(c) \_\_\_\_\_
- (d) What is the theoretical yield in grams of  $\text{Al}_2\text{O}_3$  in grams? 21(d) \_\_\_\_\_
- (e) What is the percent yield if you performed the reaction and produced 23.0 grams of Fe? 21(e) \_\_\_\_\_
- (f) How many Joules of heat will be released? 21(f) \_\_\_\_\_
- (g) Does the reaction obey Lavoisier Law? Explain. 21(g) \_\_\_\_\_