CHE 101 - Extra Practice - F18

Name: ____________________ Date: ____________________

1. What is the molecular weight of $HC_2H_3O_2$ 1. __________

2. What is the molecular weight of $Al(C_2H_3O_2)_3$ 2. __________

3. What is the molecular weight of $Sc_2(C_2O_4)_3$ 3. __________

4. What is the molarity of a solution made from 25.0 grams of $Mg(OH)_2$ dissolved in 175.0 mL of water? 4. __________

5. How many grams of HCl are required to make 105.0 mL of 2.75 M HCl? 5. __________

6. Given the reaction: $2\ NaOH(aq) + 1\ H_2SO_4(aq) \longrightarrow 1\ Na_2SO_4(aq) + 2\ H_2O(l)$ how many grams of Na_2SO_4 can be produced from 25.0 grams of NaOH. 6. __________]

7. What is the molarity of a solution made from 25.0 grams of NaOH dissolved in 350.0 mL of water? 7. __________

8. How many grams of NaOH are required to make 250.0 mL of 1.25 M NaOH? 8. __________

9. 27.5 mL of 0.35M NaOH is how many grams of NaOH?

   9. __________

10. Jay performed a titration and noted that 225.0 mL of 0.85 M NaOH completely neutralized 175 mL of H_2SO_4. What is the Molarity of the H_2SO_4 solution? (Hint: $2NaOH(aq) + H_2SO_4(aq) \longrightarrow 2HOH(l) + Na_2SO_4(aq) + heat$.

    10. __________

11. Jay performed a titration and noted that 15.0 mL of 8.0 M NaOH completely neutralized an unknown volume of 6.5 M H_2SO_4. What is the volume (in mL) of the H_2SO_4 solution? (Hint: $2NaOH(aq) + H_2SO_4(aq) \longrightarrow 2HOH(l) + Na_2SO_4(aq) + heat$.

    11. __________

12. How many grams of HCl are required to make 750.0 mL of 3.000 M HCl? 12. __________

13. What is the molarity of a solution made from 15.0 grams of $AgNO_3$ dissolved in 275.0 mL of water? 13. __________

14. Answer the following questions about the given the reaction:
    $2\ H_3PO_4(aq) + 3\ Mg(OH)_2(aq) \longrightarrow 1\ Mg_3(PO_4)_2(aq) + 6\ H_2O(l) + 12.0kJ$

    (a) How many grams of $Mg_3(PO_4)_2$ can be produced from 125.0 grams of $Mg(OH)_2$. 14(a) __________

    (b) How many grams of H_3PO_4 are required to react with 11.0 grams of $Mg(OH)_2$. 14(b) __________

15. Bob performed a titration and noted that 75.0 mL of 0.65 M $Mg(OH)_2$ completely neutralized 250.0 mL of HCl. What is the Molarity of the HCl solution?
Hint: $1\ Mg(OH)_2(aq) + 2\ HCl(aq) \longrightarrow 2\ HOH(l) + MgCl_2(aq)$. 15. ______________

16. How many mL of 0.55 M NaOH are required to neutralize 195.0 mL of 1.87 M H_2SO_4?
Hint: $1\ H_2SO_4(aq) + 2\ NaOH(aq) \longrightarrow 2\ HOH(l) + 1\ Na_2SO_4(aq)$. 16. ______________

17. Todd performed a titration and noted that 115.0 mL of 0.85 M $Mg(OH)_2$ completely neutralized 135.0 mL of H_3PO_4. What is the Molarity of the H_3PO_4 solution?
Hint: $3\ Mg(OH)_2(aq) + 2H_3PO_4(aq) \longrightarrow 6\ HOH(l) + Mg_3(PO_4)_2(s)$. 17. ______________

18. How many mL of 3.25 M $Mg(OH)_2$ are required to neutralize 240.0 mL of 1.25 M H_3PO_4?
Hint: $3\ Mg(OH)_2(aq) + 2\ H_3PO_4(aq) \longrightarrow 6\ HOH(l) + Mg_3(PO_4)_2(s)$. 18. ______________

19. Jay is baking apple pies using the following recipe: 3 Apples + 2 cups sugar + 5 teaspoons Cinnamon + 4 cups Flour $\longrightarrow$ 2.5 apple pies. In my cupboard I have the following: 24 apples, 10 cups of Sugar, 30 teaspoons of Cinnamon and 25 cups of Flour. Answer the following questions:

    (a) What is the limiting ingredient? 19(a) ______________

    (b) Amount of Apples left: 19(b) ______________

    (c) Amount of Sugar left: 19(c) ______________

    (d) Amount of Cinnamon left: 19(d) ______________

    (e) Amount of Flour left: 19(e) ______________

    (f) Number of pies made: 19(f) ______________

20. Given the reaction: $3\,Mg(OH)_2(aq) + 2\,H_3PO_4(aq) \longrightarrow Mg_3(PO_4)_2(aq) + 6\,HOH + 543\,kJ$
25.0 g of $Mg(OH)_2$ was reacted with 50.0 g of H_3PO_4. MW: $Mg(OH)_2$ = 58.3258 g/mol, H_3PO_4 = 97.9937 g/mol, $Mg_3(PO_4)_2$ = 262.87 g/mol, and HOH = 18.0158 g/mol.

    (a) What was the limiting reactant? 20(a) ______________

    (b) Moles $Mg(OH)_2$ left: 20(b) ______________

    (c) Moles H_3PO_4 left: 20(c) ______________

    (d) Moles $Mg_3(PO_4)_2$ left: 20(d) ______________

    (e) Moles HOH left: 20(e) ______________

    (f) Is the reaction Endothermic or Exothermic? 20(f) ______________

    (g) How much heat is consumed/produced in the reaction? 20(g) ______________

21. Given the reaction: $2\,Al(OH)_3() + 3\,H_2SO_4(aq) \longrightarrow Al_2(SO_4)_3(s) + 6\,HOH + 115kJ$
35.75 g of $Al(OH)_3$ was reacted with 40.25 g of H_2SO_4.
MW: $Al(OH)_3$ = 77.97 g/mol, H_2SO_4 = 98.09 g/mol, $Al_2(SO_4)_3$ = 342.11 g/mol, and H_2O = 18.02 g/mol.

(a) What was the limiting reactant? 21(a) ____________

(b) Moles H_2SO_4 left: 21(b) ____________

(c) Moles $Al(OH)_3$ left: 21(c) ____________

(d) Moles $Al_2(SO_4)_3$ left: 21(d) ____________

(e) Moles H_2O left: 21(e) ____________

(f) Is the reaction Endothermic or Exothermic? 21(f) ____________

(g) How much heat is consumed/produced in the reaction? 21(g) ____________

22. Given the reaction: $2\,C_2H_6 + 7\,O_2 \longrightarrow 4\,CO_2 + 6\,H_2O + 75\,kJ$
22.25 g of C_2H_6 was reacted with 22.05 g of O_2.
MW: C_2H_6 = 30.07 g/mol, O_2 = 32.00 g/mol, CO_2 = 44.01 g/mol, and H_2O = 18.02 g/mol.

(a) What was the limiting reactant? 22(a) ____________

(b) Moles O_2 left: 22(b) ____________

(c) Moles C_2H_6 left: 22(c) ____________

(d) Moles CO_2 left: 22(d) ____________

(e) Moles H_2O left: 22(e) ____________

(f) Is the reaction Endothermic or Exothermic? 22(f) ____________

(g) How much heat is consumed/produced in the reaction? 22(g) ____________

23. Answer the following questions about the reaction below. Clearly label and show work in the space provided below, or on a separate sheet of paper.
Hint: $1\ Al(NO_3)_3(aq) + 3\ NaI(aq) + 75.0kJ \longrightarrow 3\ NaNO_3(aq) + 1\ AlI_3(s)$.

(a) What is the limiting reagent if you start with 15.0 grams of NaI and 10.0 grams of $Al(NO_3)_3$? 23(a) ____________

(b) What is the theoretical yield of AlI_3 in grams? 23(b) ____________

(c) How many grams of the excess reagent will be left over? 23(c) ____________

(d) What is the percent yield if you performed the reaction in lab and produced 12.50 grams of AlI_3? 23(d) ____________

(e) Is the reaction exothermic or endothermic? 23(e) ____________

(f) How much energy (in Joules) is consumed/produced in the reaction? 23(f) ____________

24. Answer the following questions about the reaction below. Clearly label and show work in the space provided below, or on a separate sheet of paper.
Hint: 3 $Mg(OH)_2(aq)$ + 2 $H_3PO_4(aq) \longrightarrow$ 6 $HOH(l)$ + 1 $Mg_3(PO_4)_2(s)$ + 320. kJ.

    (a) What is the limiting reagent if you start with 25.0 grams of $Mg(OH)_2$ and 25.0 grams of H_3PO_4? 24(a) ____________

    (b) What is the theoretical yield in grams of $Mg_3(PO_4)_2$ in grams? 24(b) ____________

    (c) How many grams of the excess reagent will be left over? 24(c) ____________

    (d) What is the percent yield if you performed the reaction and produced 12.50 grams of $Mg_3(PO_4)_2$? 24(d) ____________

    (e) Is the reaction exothermic or endothermic? 24(e) ____________

    (f) How much energy (in Joules) is consumed/produced in the reaction? 24(f) ____________
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25. Given the reaction: $H_2SO_4(aq) + 2\,NaOH(aq) \longrightarrow Na_2SO_4(aq) + 2\,H_2O + 784\,kJ$
34.7 g of H_2SO_4 was reacted with 75.0 g of NaOH. MW: H_2SO_4 = 98.09 g/mol, NaOH = 40.00 g/mol, Na_2SO_4 = 142.05 g/mol, and H_2O = 18.02 g/mol.

    (a) What was the limiting reactant? 25(a) ____________

    (b) Grams H_2SO_4 left: 25(b) ____________

    (c) Grams NaOH left: 25(c) ____________

    (d) Grams Na_2SO_4 left: 25(d) ____________

    (e) Grams H_2O left: 25(e) ____________

    (f) Is the reaction Endothermic or Exothermic? 25(f) ____________

    (g) How much heat is consumed/produced in the reaction? 25(g) ____________

26. Answer the following questions about the reaction of Sodium Iodide with Barium Chloride to produce Sodium Chloride and Barium Chloride. (Clearly label and show work in the space provided below.)
$2NaI + BaCl_2 + 200kJ \longrightarrow 2NaCl + BaI_2(s)$

    (a) What is the limiting reagent if you start with 50.0 grams of NaI and 35.0 grams of $BaCl_2$? 26(a) ____________

    (b) What is the theoretical yield in grams of BaI_2 in grams? 26(b) ____________

    (c) How many grams of the excess reagent will be left over? 26(c) ____________

    (d) What is the percent yield if you performed the reaction and produced 15.0 grams of BaI_2? 26(d) ____________

    (e) Is the reaction exothermic or endothermic? 26(e) ____________

    (f) How much energy is consumed/produced in the reaction? 26(f) ____________