Stoichiometry Practice Problems

Mole-Mole

1. How many moles of hydrogen are needed to completely react with 2 moles of nitrogen?
   $N_2 + 3H_2 \rightarrow 2NH_3$

2. How many moles of oxygen are produced by the decomposition of six moles of potassium chlorate?
   $2KClO_3 \rightarrow 2KCl + 3O_2$

3. How many moles of hydrogen are produced from the reaction of three moles of zinc with an excess of hydrochloric acid?
   $Zn + 2HCl \rightarrow ZnCl_2 + H_2$

4. How many moles of oxygen are necessary to react completely with four moles of propane (C3H8)?
   $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

5. How many moles of potassium nitrate are produced when two moles of potassium phosphate and excess aluminum nitrate?
   $K_3PO_4 + Al(NO_3)_3 \rightarrow 3KNO_3 + AlPO_4$

Mole-Mass

6. If 5.2 moles of H_2 react with excess O_2 how many grams of H_2O are produced?
   $2H_2 + O_2 \rightarrow 2H_2O$

7. If 0.37 moles of N_2 reacts with excess H_2, how many grams of NH_3 will be produced?
   $N_2 + 3H_2 \rightarrow 2NH_3$

8. How many grams of CO would be needed to completely react with 3.4 moles of O_2 to form CO_2?
   $2CO + O_2 \rightarrow 2CO_2$

9. If 12.3 grams of Zn react with excess HCl, how many moles of H_2 would be produced?
   $Zn + 2HCl \rightarrow H_2 + ZnCl_2$

10. If 125.33 grams of H_2SO_4 react with excess NaOH how many moles of Na_2SO_4 would be produced?
    $H_2SO_4 + 2NaOH \rightarrow H_2O + Na_2SO_4$

Mass-Mass

11. How many grams of potassium chloride are produced if 25.0 g of potassium chlorate decompose?
    $2KClO_3 \rightarrow 2KCl + 3O_2$

12. If 13.0 grams of aluminum chloride decompose, how many grams of chlorine will be produced?
    $2AlCl_3 \rightarrow 2Al + 3Cl_2$

13. When 34.34 grams of hydrochloric acid react with excess magnesium how much magnesium chloride will be produced?
    $Mg + 2HCl \rightarrow MgCl_2 + H_2$

14. How many grams of silver nitrate will be needed to completely react with 120.21 grams of sodium phosphate to produce silver phosphate and sodium nitrate?
    $3AgNO_3 + Na_3PO_4 \rightarrow Ag_3PO_4 + 3NaNO_3$

15. If excess potassium hydroxide is present, how many grams of iron (III) chloride would be needed to react with potassium hydroxide to produce 89.13 grams of potassium chloride?
    $FeCl_3 + 3KOH \rightarrow 3KCl + Fe(OH)_3$

Mole to volume (assume all the volume problems are at STP)

16. If 3.8 moles HCl reacts with excess zinc, how many liters of hydrogen gas was produced?

$$Zn + 2HCl \rightarrow H_2 + ZnCl_2$$

17. If 43.22L of oxygen gas was produced, how many moles of $KClO_3$ decomposed?

$$2KClO_3 \rightarrow 2KCl + 3O_2$$

Mass to volume (assume all the volume problems are at STP)

18. If 17.22g of CO reacted with excess oxygen, how many liters of CO_2 is produced?

$$2CO + O_2 \rightarrow 2CO_2$$

19. If 65.32L of hydrogen gas was produced, how many grams of zinc was needed to react?

$$Zn + 2HCl \rightarrow H_2 + ZnCl_2$$

20. If 234.22g $KClO_3$ breaks down to produce how many liters of oxygen gas?

$$2KClO_3 \rightarrow 2KCl + 3O_2$$