

① The trick here is to go from grams to moles then moles to molecules

$$1.00\text{g} \times \frac{\text{mole}}{18.0\text{g}} \times \frac{6.02 \times 10^{23} \text{ molecules}}{\text{mole}} = 3.34 \times 10^{22} \text{ molecules}$$

② 6.02×10^{23} atoms

③ 1 mole = 12 grams (for carbon-12)

④ NO_2 $(1 \times 14.0) + (2 \times 16.0) = \frac{46.0\text{g}}{\text{mole}}$

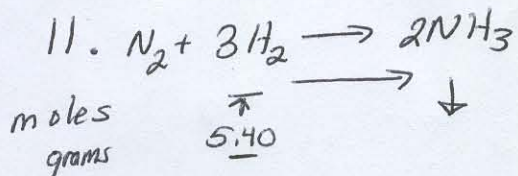
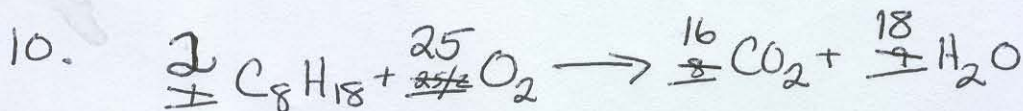
⑤ CO_2 $(1 \times 12.0) + (2 \times 16.0) = \frac{44.0\text{g}}{\text{mole}}$

⑥ This is tricky. An oxygen molecule is O_2 . (It is one of seven elements that exist as a diatomic molecule in the elemental state)

$$\text{O}_2 \quad (2 \times 16.0) = \frac{32.0\text{g}}{\text{mole}}$$

7 & 8: see 4 & 5

9 $(1 \times 40.1) + (2 \times 16.0) + (2 \times 1.0) = \frac{74.1\text{g}}{\text{mole}}$

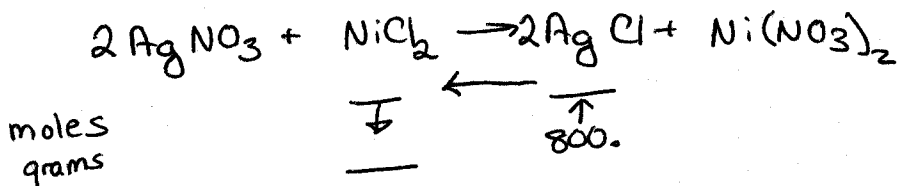


step 1: $5.40\text{g H}_2 \times \frac{\text{mole}}{2.00\text{g}} = 2.70 \text{ moles H}_2$

step 2: $2.70 \text{ moles H}_2 \times \frac{2 \text{ NH}_3}{3 \text{ H}_2} = 1.80 \text{ moles NH}_3$

step 3: $1.80 \text{ moles NH}_3 \times \frac{17.0\text{g}}{\text{mole}} = 30.6\text{g NH}_3$

#12



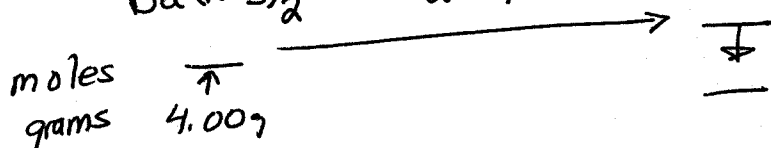
$$\text{FW}_{\text{AgCl}} = 107.9 + 35.5 = \frac{143.4 \text{g}}{\text{mole}}$$

$$\text{FW}_{\text{NiCl}_2} = 58.7 + (2 \times 35.5) = \frac{129.7 \text{g}}{\text{mole}}$$

$$\text{step 1: } 800. \text{g AgCl} \times \frac{\text{mole}}{143.4 \text{g}} = 5.58 \text{ moles AgCl}$$

$$\text{step 2: } 5.58 \text{ moles AgCl} \times \frac{1 \text{ NiCl}_2}{2 \text{ AgCl}} = 2.79 \text{ moles NiCl}_2$$

$$\text{step 3: } 2.79 \text{ moles NiCl}_2 \times \frac{129.7 \text{g}}{\text{mole}} = \boxed{362 \text{g NiCl}_2}$$



$$\text{Ba(NO}_3)_2 = 137.3 + (2 \times 14.0) + (6 \times 16.0) = \frac{261.3 \text{g}}{\text{mole}}$$

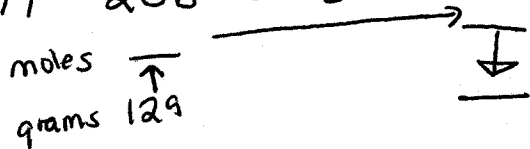
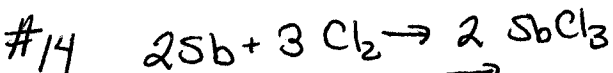
$$\text{BaSO}_4 = 137.3 + (32.0) + (4 \times 16.0) = \frac{233.4 \text{g}}{\text{mole}}$$

Notice I am assuming I meant 4.00 g.

$$\text{step 1: } 4.00 \text{g Ba(NO}_3)_2 \times \frac{\text{mole}}{261.3 \text{g}} = 1.53 \times 10^{-2} \text{ moles Ba(NO}_3)_2 \text{ (}.0153 \text{ moles)}$$

$$\text{step 2: } 1.53 \times 10^{-2} \text{ moles Ba(NO}_3)_2 \times \frac{1 \text{ BaSO}_4}{1 \text{ Ba(NO}_3)_2} = 1.53 \times 10^{-2} \text{ moles BaSO}_4$$

$$\text{step 3: } 1.53 \times 10^{-2} \text{ moles BaSO}_4 \times \frac{233.4 \text{g}}{\text{mole}} = \boxed{3.57 \text{g BaSO}_4}$$



$$\text{step 1: } 129 \text{g Sb} \times \frac{\text{mole}}{121.8 \text{g}} = 1.06 \text{ moles Sb}$$

$$\text{step 2: } 1.06 \text{ moles Sb} \times \frac{2 \text{ SbCl}_3}{2 \text{ Sb}} = 1.06 \text{ moles SbCl}_3$$

$$\text{step 3: } 1.06 \text{ moles SbCl}_3 \times \frac{228.3 \text{g}}{\text{mole}} = \boxed{242 \text{g SbCl}_3}$$

$$\text{FW}_{\text{Sb}} = \frac{121.8 \text{g}}{\text{mole}}$$

$$\text{FW}_{\text{SbCl}_3} = 121.8 + (3 \times 35.5) = \frac{228.3 \text{g}}{\text{mole}}$$

15.1 Zn is going from Zn^0 to Zn^{2+} , it is being oxidized.
It is the reducing agent

Cu is going from Cu^{2+} to Cu^0 . It is being reduced.
It is the oxidizing agent.

15.2 Cobalt is going from Co^{2+} to Co^0 . It is being reduced.
It is the oxidizing agent

Tin (Sn) is going from Sn^0 to Sn^{2+} . It is being oxidized.
It is the reducing agent.

15.3 Carbon is being oxidized, it is the reducing agent.
Oxygen is being reduced, it is the oxidizing agent.

15.4 Same as 15.3.

16.1 d, redox. Mg & H are changing charges

16.2 a. formation of a solid.

16.3 c. formation of water, acid/base

16.4 d redox there are changing charges.

16.5 d redox there are changing charges.

16.6 a formation of a solid.

16.7 a formation of a solid

17.1 c single replacement

17.5 a combination

17.2 d double replacement

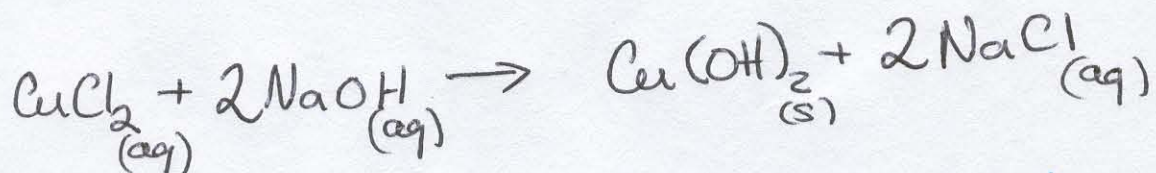
17.6 d double replacement

17.3 d double replacement

17.7 d double replacement

17.4 ~~a~~ ^c combination single replacement

18. The trick here is to identify that this is a double replacement reaction & to identify A, B, C, D



1) use the switcheroo rule to find the correct products

2) Balance the equation.

3) use solubility rules to determine (aq) or (s)

