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Chemistry 11

Stoichiometry Worksheet – Unit Review

Directions: Answer in the space provided. Have fun ☺

1. When 85.1 g of zinc are reacted with 125.65 g hydrochloric acid, HCl, to produce zinc chloride, $ZnCl_2$, and hydrogen gas, H_2, which reactant will be in excess and by how much? Calculate the number of grams of H_2.

$$Zn + 2\,HCl \longrightarrow ZnCl_2 + H_2$$

2. If 10.45 g of aluminium are reacted with 66.55 g of copper (II) sulphate, $CuSO_4$, then aluminium sulphate, $Al_2(SO_4)_3$, and copper are formed. Which reactant is in excess? By how much? Calculate the mass of each product.

$$2\,Al + 3\,CuSO_4 \longrightarrow Al_2(SO_4)_3 + 3\,Cu$$

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3. Large amounts of uranium metals are produced by reacting uranium (IV) chloride with magnesium metal to produce magnesium chloride and uranium metal.

   a. How many grams of magnesium are required to completely react 155 g of uranium (IV) chloride?

   b. How many grams of uranium metal will be produced?

4. The methyl alcohol, CH_3OH, used in alcohol burners combines with oxygen gas to form carbon dioxide and water. How many ml's of oxygen gas at S.T.P are required to burn 34.2 g of methyl alcohol?

5. What volume of 0.60M copper (II) sulphate will react with 45 ml of 1.50 M sodium hydroxide to form copper (II) hydroxide and sodium sulphate?

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6. Caustic Soda (NaOH) is prepared commercially by passing an electric current through a concentrated solution of salt in water:

   a. What is the theoretical yield of caustic soda if 100.0 kg of sodium chloride is electrolysed?

   b. What is the percent yield if the electrolysis produces 55.0 kg of caustic soda?

7. Freon-12 (CCl_2F_2) is a gas used as a refrigerant. It is prepared by the reaction:

   If the % yield is 72.0, how many grams of antimony triflouride (SbF_3) will be produced if 25.0 g of Freon-12 is reacted with excess carbon tetrachloride?

8. What volume, in ml's, of 0.550 M Nickel (II) nitrate, will react with 85.0 ml of 0.250 M potassium carbonate to form nickel (I) carbonate and potassium nitrate,

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9. 5.45 g of potassium chlorate is decomposed and forms potassium chloride and 1.95 g of oxygen gas.

   a. Calculate the theoretical yield of oxygen.

   b. Calculate the % yield of oxygen.

10. If 15.50 g of lead (II) nitrate, $Pb(NO_3)_2$, are reacted with 3.81 g of sodium chloride, NaCl, then sodium nitrate, $NaNO_3$, and lead (II) chloride, $PbCl_2$, are formed.

   a. Which reactant will be in excess?

   b. Calculate the mass of the excess reactant.

   c. Calculate the mass of lead (II) chloride produced.