

## Chem11 Stoichiometry : Test - 70

1) Given the reaction :  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

### Fill in the blanks.

a) The moles equation is :

\_\_\_\_\_ moles  $\text{N}_2$  + \_\_\_\_\_ moles  $\text{H}_2$  yields \_\_\_\_\_ moles  $\text{NH}_3$

b) \_\_\_\_\_ molecules of  $\text{N}_2$  + \_\_\_\_\_ molecules of  $\text{H}_2$  yields \_\_\_\_\_ molecules  $\text{NH}_3$ .

c) \_\_\_\_\_ moles  $\text{N}_2$  + 12 moles  $\text{H}_2$  yields \_\_\_\_\_ moles  $\text{NH}_3$

d) \_\_\_\_\_ moles  $\text{N}_2$  + \_\_\_\_\_ moles  $\text{H}_2$  yields 0.25 moles  $\text{NH}_3$

e)  $3.2 \times 10^4$  moles  $\text{N}_2$  + \_\_\_\_\_ moles  $\text{H}_2$  yields \_\_\_\_\_ moles  $\text{NH}_3$

f) \_\_\_\_\_ moles  $\text{N}_2$  +  $5.8 \times 10^{-3}$  moles  $\text{H}_2$  yields \_\_\_\_\_ moles  $\text{NH}_3$

2) Write down the mass equation for the reaction in question #1.

a) \_\_\_\_\_ grams  $\text{N}_2$  + \_\_\_\_\_ grams  $\text{H}_2$  yields \_\_\_\_\_ grams  $\text{NH}_3$ .

### Fill in the blanks.

b) \_\_\_\_\_ grams  $\text{N}_2$  + 42.0 grams  $\text{H}_2$  yields \_\_\_\_\_ grams  $\text{NH}_3$

c) \_\_\_\_\_ grams  $\text{N}_2$  + \_\_\_\_\_ grams  $\text{H}_2$  yields  $8.1 \times 10^7$  grams  $\text{NH}_3$

d)  $4.7 \times 10^{-3}$  grams  $\text{N}_2$  + \_\_\_\_\_ grams  $\text{H}_2$  yields \_\_\_\_\_ grams  $\text{NH}_3$

3) Given the reaction :  $2\text{Fe} + 3\text{Cl}_2 \rightarrow 2\text{FeCl}_3$

a) The moles equation is :

\_\_\_\_\_ moles  $\text{Fe}$  + \_\_\_\_\_ moles  $\text{Cl}_2$  yields \_\_\_\_\_ moles  $\text{FeCl}_3$

b) The mass equation is :

\_\_\_\_\_ grams  $\text{Fe}$  + \_\_\_\_\_ grams  $\text{Cl}_2$  yields \_\_\_\_\_ grams  $\text{FeCl}_3$

c) In the above reaction, 65.0 grams of Fe reacts with 128.0 grams of  $\text{Cl}_2$ . The **excess reagent** is \_\_\_\_\_. The **limiting reagent** is \_\_\_\_\_. The amount of  $\text{FeCl}_3$  produced is \_\_\_\_\_. The amount of excess reagent left over is \_\_\_\_\_ grams.

4) Given :  $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$

a) Write down the **mass equation** :

\_\_\_\_\_ grams  $\text{KClO}_3$  yields \_\_\_\_\_ grams  $\text{KCl}$  + \_\_\_\_\_ grams  $\text{O}_2$ .

b) Find the **theoretical yield** for  $\text{KCl}$  if 85.0 grams of  $\text{KClO}_3$  is heated. \_\_\_\_\_ .

c) If 85.0 grams of "impure"  $\text{KClO}_3$  is heated and produces 46.0 grams of  $\text{KCl}$ , the **actual yield** is \_\_\_\_\_ g, and the **percentage yield** is \_\_\_\_\_ %.

5) Ammonium dichromate decomposes on heating to give chromium (III) oxide, nitrogen gas, and water vapor.

a) Write a balanced equation for this reaction.

b) If 57.0 grams of pure ammonium dichromate is decomposed, how many **moles** of chromium (III) oxide are formed ?

Answers : 1)a) 1, 3, 2, b) 1, 3, 2, c) 4, 8, d) 0.13, 0.38, e)  $9.6 \times 10^4$ ,  $6.4 \times 10^4$ , f)  $1.9 \times 10^{-3}$ ,  $3.9 \times 10^{-3}$ , 2)a) 28.0, 6.0, 34.0, b)  $2.0 \times 10^2$ ,  $2.4 \times 10^2$ , c)  $6.7 \times 10^7$ ,  $1.4 \times 10^7$ , d)  $1.0 \times 10^{-3}$ ,  $5.7 \times 10^{-3}$ , 3)a) 2, 3, 2, b) 111.7, 212.7, 324.4, c)  $\text{Cl}_2$ , Fe, 188.8, 4.2. 4)a) 245.1, 149.1, 96.0, b) 51.7, c) 46.0, 89.0, 5)a)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{Cr}_2\text{O}_3 + \text{N}_2 + 4\text{H}_2\text{O}$ , b) 0.226.