KEY

Stoichiometry

Name - _____

1.) In the reaction _2_ C_2H_6 + _7_ O_2 → _4_ CO_2 + _6_ H_2O

a.) How many oxygen molecules react with $6\ molecules$ of C_2H_6?

Answer - $6\ molec\ C_2H_6 \times \frac{7\ molec\ O_2}{2\ molec\ C_2H_6} = 21\ molec\ O_2$

b.) How many H_2O molecules are produced when $12\ molecules$ of C_2H_6 react?

Answer - $12\ molec\ C_2H_6 \times \frac{6\ molec\ H_2O}{2\ molec\ C_2H_6} = 36\ molec\ H_2O$

c.) How many moles of oxygen molecules are needed to produce $18\ moles$ of CO_2?

Answer - $18\ mol\ CO_2 \times \frac{7\ mol\ O_2}{4\ mol\ CO_2} = 31.5 = 32\ mol\ O_2$

d.) How many moles of CO_2 are produced when $13\ moles$ of C_2H_6 are used up?

Answer - $13\ mol\ C_2H_6 \times \frac{4\ mol\ CO_2}{2\ mol\ C_2H_6} = 26\ mol\ CO_2$

2.) In the reaction _3_ Fe + _4_ H_2O → ___ Fe_3O_4 + _4_ H_2

a.) How many molecules of Fe_3O_4 are produced when $12\ atoms$ of Fe react?

Answer - $12\ atoms\ Fe \times \frac{1\ molec\ Fe_3O_4}{3 atoms\ Fe} = 4\ molec\ Fe_3O_4$

b.) How many moles of Fe are required to produce $16\ moles$ of H_2?

Answer - $16\ mol\ H_2 \times \frac{3\ mol\ Fe}{4\ mol\ H_2} = 12\ mol\ Fe$

c.) How many H_2 molecules are made when $40\ molecules$ of Fe_3O_4 are produced?

Answer - $40\ molec\ Fe_3O_4 \times \frac{4\ molec\ H_2}{1\ atoms\ Fe_3O_4} = 160\ molec\ H_2$

d.) How many moles of H_2O are required to react with $14.5\ moles$ of Fe?

Answer - $14.5\ mol\ Fe \times \frac{4\ mol\ H_2O}{3\ mol\ Fe} = 19.3\ mol\ H_2O$

KEY

3.) How many moles of H_2O are produced when $9.6\ moles$ of $O_{2\ (g)}$ react according to the equation

$$\_2\_\ H_{2\ (g)} + \_\_\_\_\ O_{2\ (g)} \rightarrow \_2\_\ H_2O_{\ (g)}$$

Answer – $9.6\ mol\ O_2 \times \frac{2\ mol\ H_2O}{1\ mol\ O_2} = 19.2\ mol\ = 19\ mol\ H_2O$

4.) Consider the equation $\_3\_\ I_{2\ (g)} + \_6\_\ F_{2\ (g)} \rightarrow \_2\_\ IF_{5\ (g)} + \_\_\_\_\ I_4F_{2\ (g)}$

a.) How many moles of $I_4F_{2\ (g)}$ are produced by $5.40\ moles$ of $F_{2\ (g)}$?

Answer – $5.40\ mol\ F_2 \times \frac{1\ mol\ I_4F_2}{6\ mol\ F_2} = 0.900\ mol\ I_4F_2$

b.) How many moles of $F_{2\ (g)}$ are required to produce $4.50\ moles$ of $IF_{5\ (g)}$?

Answer – $4.50\ mol\ IF_5 \times \frac{6\ mol\ F_2}{2\ mol\ IF_5} = 13.5\ mol\ F_2$

c.) How many moles of $I_{2\ (g)}$ are required to react with $7.60\ moles$ of $F_{2\ (g)}$?

Answer – $7.60\ mol\ F_2 \times \frac{3\ mol\ I_2}{6\ mol\ F_2} = 3.80\ mol\ I_2$

5.) A student decomposes some hydrogen peroxide, H_2O_2, according to the following reaction

$$\_2\_\ H_2O_2 \rightarrow \_2\_\ H_2O + \_\_\_\_\ O_2$$

If a total of $0.125\ moles$ of reactants and products are involved in the reaction, how many moles of O_2 are produced?

Answer – $0.125\ mol\ all \times \frac{1\ mol\ O_2}{5\ mol\ all} = 0.025\ mol\ O_2$