ANSWER KEY

Sample Calculations of Average Reaction Rate:

1. Data collected: 25g of S produced in 5 min. Calculate the Average Reaction rate :

   5 g/min

2. C_2H_6 (l) + **7/2** O_2 (g) → **2** CO_2 (g) + **3**H_2O (g)

   0.05 mol/s **0.175 mol/s** **0.10 mol/s** **0.15 mol/s**

   Calculate the rate of O_2 needed and the rate of production of products.

   = 0.2 mol/s (2 SF)

3. **3**H_2 (g) + N_2 (g) → **2**NH_3 (g)

   12 L/s **4L/s** **8L/s**

   Calculate the rate at which H_2 and N_2 must be supplied to maintain the production of 8L/s of NH_3 at constant temp. and pressure.

4. How fast is NO(g) produced when 2.0 mol/min of NH_3(g) are reacted with excess O_2(g)?

   2NH_3 (g) + **5/2**O_2 (g) → **2**NO (g) + **3**H_2O (g) + 453 kJ

   2.0 mol/min **2.0 mol/min**

   The product of +453 kJ only tells us that this is an exothermic reaction. We don't include it in our mole stoichiometry calculations.

5. At what rate must NH_3 (g) at STP be supplied to react at a rate of 3.0 mL / min of O_2 (g)?

   2NH_3 (g) + **5/2**O_2 (g) → **2**NO (g) + **3**H_2O (g) + 453 kJ

   2.4 ml/min **3.0 ml/min**

6. How long will it take to completely react 45.0 g of solid calcium carbonate with dilute hydrochloric acid if the reaction proceeds at an average rate of 2.35 g / min solid calcium carbonate under certain conditions?

   $$45.0\ g \times \frac{1\ min}{2.35\ g} = 19.1\ min$$

7. A 5.0 g sample of magnesium reacts completely with a hydrochloric acid solution after 150 s. Express the average rate of consumption of magnesium, in units of g/min.

   $$\frac{5.0\ g}{150 s} \times \frac{60\ s}{min} = \frac{2.0\ g}{min}$$