

## 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.  $\text{C}_2\text{H}_6$  (l) + **7/2**  $\text{O}_2$  (g)  $\rightarrow$  **2**  $\text{CO}_2$  (g) + **3**  $\text{H}_2\text{O}$  (g)  
0.05 mol/s    **0.175 mol/s**                      **0.10 mol/s**                      **0.15 mol/s**

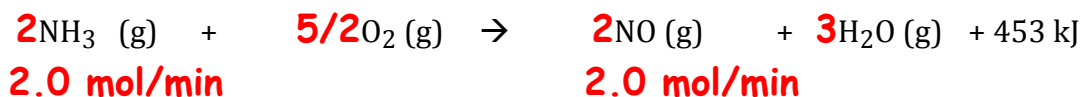
Calculate the rate of  $\text{O}_2$  needed and the rate of production of products.

**= 0.2 mol/s (2 SF)**

3. **3**  $\text{H}_2$  (g) +  $\text{N}_2$  (g)  $\rightarrow$  **2**  $\text{NH}_3$  (g)  
**12 L/s**                      **4L/s**                      **8L/s**

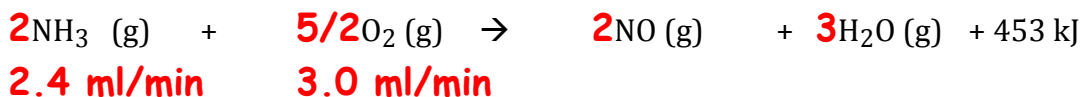
Calculate the rate at which  $\text{H}_2$  and  $\text{N}_2$  must be supplied to maintain the production of 8L/s of  $\text{NH}_3$  at constant temp. and pressure.

4. How fast is  $\text{NO(g)}$  produced when 2.0 mol/min of  $\text{NH}_3(\text{g})$  are reacted with excess  $\text{O}_2(\text{g})$ ?



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  $\text{NH}_3$  (g) at STP be supplied to react at a rate of 3.0 mL / min of  $\text{O}_2$  (g)?



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?

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

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.

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