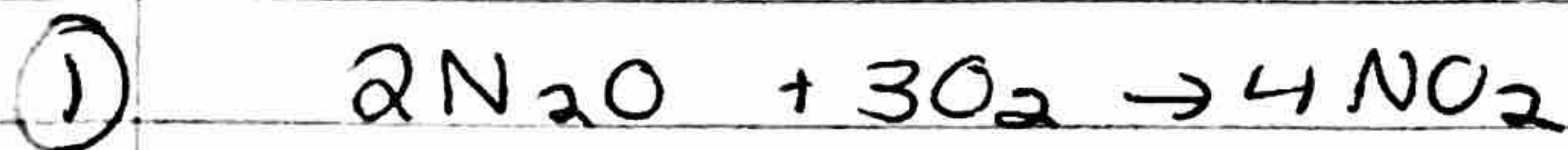
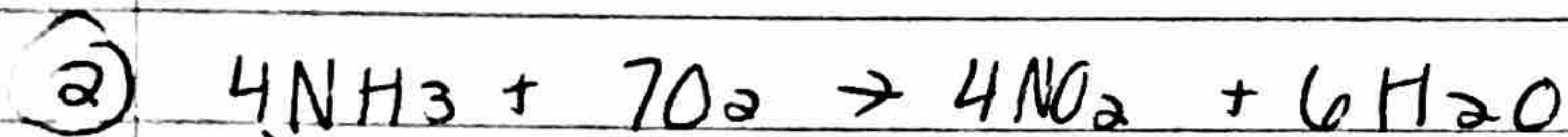


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O_2 is used up 1.5 times faster than N_2O is consumed
 NO_2 is produced 2 times faster than N_2O is consumed



a) $\text{H}_2\text{O} = 36 \text{ mol M/min}$

$\frac{4}{6} (36) = 24 \text{ M/min}$ NH_3

b) $\frac{7}{6} (36) = 42 \text{ M/min}$

c) $\frac{4}{6} (36) = 24 \text{ M/min}$

3) $\frac{3.2 \text{ M}}{2^2} = 0.8 \text{ M}$ $\frac{3.2}{2^6} = 0.05 \text{ M}$

* Radioactive half-lives *

Rate = $k [1] [1]$ = Rate = $[1]$

4) a) Rate = $k [3] [0.5]$ Rate = 1.5 times faster

b) Rate = $k [3]^2 [0.5]$ Rate = 4.5 times faster

c) Rate = $k [3]^2 [0.5]^2$ Rate = 2.25 times faster

d) Rate = $k [3] [0.5]^3$ Rate = .375

$$\textcircled{5} \text{ a) } \frac{4.0 \times 10^{-6}}{2.0 \times 10^{-6}} = \frac{k [1 \times 10^{-1}]^n}{k [5 \times 10^{-2}]^n}$$

$$2 = 2^n$$

$$\textcircled{n=1}$$

$$\text{b) } \frac{2.0 \times 10^{-6}}{2.0 \times 10^{-6}} = \frac{[4.0 \times 10^{-2}]^m}{[2.0 \times 10^{-2}]^m}$$

$$1 = 2^m$$

$$\textcircled{m=0}$$

c) 1st order

$$\text{d) Rate} = k [(\text{CH}_3)_3\text{CBr}]$$

$$\text{e) } 2.0 \times 10^{-6} = k [5.0 \times 10^{-2}]$$

$$k = 4.0 \times 10^{-5} \text{ min}^{-1}$$

$$\textcircled{6} \ln[A] = -kt + \ln[A]_0$$

$$\ln[.040] = -0.029(t) + \ln[.050]$$

$$\textcircled{t = 7.7 \text{ min}}$$

$$\textcircled{7} \frac{1}{[A]} = kt + \frac{1}{[A]_0}$$

$$\frac{1}{.025} = (0.080 \text{ M}^{-1}\text{s}^{-1})(t) + \frac{1}{.050}$$

$$\textcircled{t = 250 \text{ s}}$$

8) in textbook, section 12.8

$$9) t_{1/2} = \frac{\ln(2)}{k} \rightarrow k = \frac{\ln(2)}{t_{1/2}} = \frac{\ln(2)}{2.7} = 0.258 \text{ day}^{-1}$$

$$\ln(A_t) = -kt + \ln[A_0]$$

$$\ln(A_t) = (-0.258)(7) + \ln[10 \text{ mg}]$$

$$\boxed{[A_t] = 1.6 \text{ mg}}$$

10) Don't worry about this

11) a) Step 2

b) Rate = $k[\text{O}_3][\text{O}]$

c) Rate = $k[\text{O}_3][\text{O}]$

12) a) $\frac{1.5 \times 10^{-6}}{1.7 \times 10^{-7}} = \frac{[1.5 \times 10^{-3}]^n}{[5.0 \times 10^{-4}]^n}$

$$8.82 = 3^n$$

$$9 = 3^n$$

$$\boxed{n=2}$$

b) $\boxed{n=0}$

c) 2nd order

d) Rate = $k[\text{NO}_2]^2$

e) CO does not affect the rate of the reaction

