

Summary: P 813, # 1-15

1)

$$V = 2.00 \text{ L} \times 98.0 \text{ kPa} / 82.0 \text{ kPa} = 2.39 \text{ L}$$

2)

$$V = 1.50 \text{ L} \times 361 \text{ K} / 305 \text{ K} = 1.78 \text{ L}$$

3)

$$P = 135.0 \text{ kPa} \times 398 \text{ K} / 298 \text{ K} = 180 \text{ kPa}$$

4)

$$V = 101.2 \text{ kPa} \times 2.75 \text{ L} \times 310 \text{ K} / (295 \text{ K} \times 90.0 \text{ kPa}) = 3.25 \text{ L}$$

5)

$$V = 700.0 \text{ kPa} \times 1.00 \text{ L} \times 273 \text{ K} / (295 \text{ K} \times 101.3 \text{ kPa}) = 6.39 \text{ L}$$

6)

$$V = 2.50 \text{ mol} \times 8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 233 \text{ K} / 58.6 \text{ kPa} = 82.6 \text{ L}$$

7)

$$n(\text{CO}_2) = 6.60 \text{ g} / 44.01 \text{ g/mol} = 0.150 \text{ mol}$$

$$P = 0.150 \text{ mol} \times 8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 298 \text{ K} / 2.00 \text{ L} = 185 \text{ kPa}$$

8)

$$n = 450.0 \text{ kPa} \times 0.5000 \text{ L} / (8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 293 \text{ K}) = 0.0924 \text{ mol}$$

9)

$$n(\text{H}_2) = 240.0 \text{ g} / 2.02 \text{ g/mol} = 118.8 \text{ mol}$$

$$V = 118.8 \text{ mol} \times 8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 273 \text{ K} / 101.3 \text{ kPa} = 2661 \text{ L}$$

10)

$$n(\text{unknown}) = 101.3 \text{ kPa} \times 1.00 / (8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 273 \text{ K}) = 0.0446 \text{ mol}$$

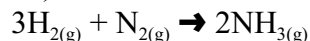
$$M(\text{unknown}) = 1.25 \text{ g} / 0.0446 \text{ mol} = 28.0 \text{ g/mol}$$

11)

$$n(\text{total}) = 101.3 \text{ kPa} \times 1.00 \text{ L} / (8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)} \times 273 \text{ K}) = 0.0446 \text{ mol}$$

$$\text{mass} = 0.80 \times 0.0446 \text{ mol} \times 28.01 \text{ g/mol} + 0.20 \times 0.0446 \text{ mol} \times 32.00 \text{ g/mol} = 1.28 \text{ g}$$

12) Since T and P are kept constant than V's can be used as moles in a BCE



$$\text{a) } V(\text{N}_2) = 75.0 \text{ L} \times 1/3 = 25.0 \text{ L}$$

$$\text{b) } V(\text{NH}_{3(\text{g})}) = 75.0 \text{ L} \times 2/3 = 50.0 \text{ L}$$

13)

$$P_{\text{tot}} = P(\text{H}_2) + P(\text{H}_2\text{O})$$

$$P(\text{H}_2) = 98.2 \text{ kPa} - 2.64 \text{ kPa} = 95.6 \text{ kPa}$$

14)

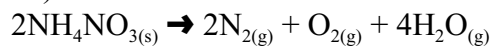


$$n(\text{H}_2) = 101.3 \text{ kPa} \times 0.2500 \text{ L} / (8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)}) \times 273 \text{ K} = 0.0112 \text{ mol}$$

$$n(\text{Zn}) = 0.0112 \text{ mol}$$

$$m(\text{Zn}) = 0.0112 \text{ mol} \times 65.38 \text{ g/mol} = 0.732 \text{ g}$$

15)



$$n(\text{NH}_4\text{NO}_{3(\text{s})}) = 1.00 \times 10^3 \text{ g} / 80.04 \text{ g/mol} = 12.5 \text{ mol}$$

$$V(\text{N}_2) = 12.5 \text{ mol} \times 8.314 \text{ (kPa}\cdot\text{L/mol}\cdot\text{K)}) \times 298 \text{ K} / 100.0 \text{ kPa} = 310 \text{ L}$$

$$\text{Total volume of gases} = 310 \text{ L} \times 7/2 = 1.09 \times 10^3 \text{ L}$$