47) $PV = nRT$

$(135\,atm)(200.0\,L) = x\left(0.0821 \frac{atm \cdot L}{mol \cdot K}\right)(297\,K)$

He: 1.11×10^3 mole $\frac{4.00\,g}{1\,mole} = 4.44 \times 10^3\,g$ He

H_2: 1.11×10^3 mole $\frac{2.02\,g}{1\,mole} = 2.24 \times 10^3\,g\ H_2$

49) $PV = nRT$

$(145\,atm)(0.0750\,L) = x\left(0.0821 \frac{atm \cdot L}{mol \cdot K}\right)(295\,K)$

$x = 0.449$ mole O_2

51) $PV = nRT$

a) $175\,g$ Ar $\frac{1\,mole}{39.95\,g} = 4.38$ mole Ar

$(10.0\,atm)(2.50\,L) = (4.38\,mol)\left(0.0821 \frac{atm \cdot L}{mol \cdot K}\right) x$

$x = 69.6\,K$

b) $PV = nRT$

$x(2.50\,L) = (4.38\,mol)\left(0.0821 \frac{atm \cdot L}{mol \cdot K}\right)(255\,K)$

$x = 32.3\,atm$

53) P_1 400 torr T_1 298K n_1 1.50 atm

P_2 800. torr T_2 323K n_2 x

P↑ n↑ T↑ n↓

$$1.50\text{ atm} \frac{800\text{ torr}}{400\text{ torr}} \frac{298\text{ K}}{323\text{ K}} = 2.77\text{ mole}$$

mole of gas added: 2.77 - 1.50 = 1.27 mol

55) $$P_B \frac{2.0\text{ mole}}{1.0\text{ mol}} \frac{1.0\text{ L}}{2.0\text{ L}} \frac{560\text{ K}}{280\text{ K}} = 2.0$$

n↑ P↑ V↑ P↓ T↑ P↑

pressure of gas B is twice the pressure of gas A

57) a) P_1 40.0 atm T_1 273K T↑ P↑

P_2 T_2 318K

$$40.0\text{ atm} \frac{318\text{ K}}{273\text{ K}} = 46.6\text{ atm}$$

b) P_1 40.0 atm T_1 273 K

P_2 1.50×10^2 atm T_2 x

P ↑ T ↑

$$273\ K \quad \frac{1.50 \times 10^2\ atm}{40.0\ atm} = 1.02 \times 10^3\ K$$

c) P_1 40.0 atm T_1 273 K

P_2 25.0 atm T_2 x

P ↓ T ↓

$$273\ K \quad \frac{25.0\ atm}{40.0\ atm} = 171\ K$$

5a) V_1 5.0×10^2 ml T_1 303 K P_1 710. torr

V_2 25 ml T_2 1093 K P_2 x

$$710.\ torr \quad \frac{5.0 \times 10^2\ ml}{25\ ml} \Bigg| \frac{1093\ K}{303\ K} = 5.1 \times 10^4\ torr$$

V ↓ P ↑ T ↑ P ↑

61) $V_1 = 1.00\,L$ T_1 296 K P_1 1.00 atm

$V_2 = ?$ T_2 242 K P_2 220. torr

$$220.\,torr \cdot \frac{1\,atm}{760\,torr} = 0.289\,atm$$

$$1.00\,L \cdot \frac{242\,K}{296\,K} \cdot \frac{1.00\,atm}{0.289\,atm} = 2.83\,L$$

T ↓ V ↓ P ↓ V ↑