1) $4.9 \times 10^2 \text{ atm} \times \frac{760 \text{ torr}}{1 \text{ atm}} = 3.72 \times 10^5$

$= \boxed{3.7 \times 10^5 \text{ Torr}}$

2) Boyles' law

$V_1 = 35\text{L}$, $P_1 = 1.2 \text{ atm}$, $P_2 = 0.76 \text{ atm}$, $V_2 = ?$

$P_1V_1 = P_2V_2 \quad V_2 = \frac{P_1V_1}{P_2} = \frac{1.2 \text{ atm} \times 35\text{L}}{0.76 \text{ atm}} = \boxed{55\text{L}}$

3) charles' law

$V_1 = 5.56\text{L}$, $T_1 = 17.0 + 273.15 = 290.2\text{K}$, $T_2 = 37.0 + 273.15 = 310.2\text{K}$

$V_2 = ?$

$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad V_2 = \frac{T_2V_1}{T_1} = \frac{310.2\text{K} \times 5.56\text{L}}{290.2\text{K}} = 5.943 = \boxed{5.94\text{L}}$

4) combined gas law

$P_1 = 1.00 \text{ atm}$, $V_1 = 10.0\text{L}$, $T_1 = 300.00\text{K}$, $P_2 = 1.50 \text{ atm}$, $V_2 = 7.50\text{L}$

$T_2 = ?$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \quad T_2 = \frac{P_2V_2T_1}{P_1V_1} = \frac{1.50 \text{ atm} \times 7.50\text{K} \times 300.00\text{K}}{1.00 \text{ atm} \times 10.0\text{L}} = 337.5$

$T_C = T_K - 273.15 = 337.5\text{K} - 273.15 = \boxed{64.4^\circ\text{C}}$

5 Ideal gas law $PV = nRT \Rightarrow n = \frac{PV}{RT}$

$P = 581 mm \times \frac{1 atm}{760 mm Hg} = 0.764 atm$

$V = 1.42 L$

$T = 307 K$

$R = 0.08206 \frac{L \cdot atm}{mol \cdot K}$

$n = \frac{0.764 atm \times 1.42 L}{307 K \times 0.08206 \frac{L \cdot atm}{mol \cdot K}} = 0.04431 mol$

6. Charles' law because pressure is constant

$T_1 = 400. K$; $V_1 = X$; $T_2 = ?$; $V_2 = \frac{X}{2}$

$\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\quad T_2 = \frac{V_2 T_1}{V_1} = \frac{\left(\frac{X}{2}\right) 400. K}{X} = 200. K$

7.) $PV = nRT$ $\quad n = \frac{PV}{RT}$

$P = 1.302 atm$

$T = 25.0 + 273.15 = 298.15 K$

$V = 3.02 L$

$R = 0.08206 \frac{L \cdot atm}{mol \cdot K}$

$n = \frac{1.302 atm \times 3.02 L}{298.15 K \times 0.0820 \frac{L \cdot atm}{mol \cdot K}} = 0.1604 mol$

$\frac{7.70 g}{0.1604 mol} = 48.0 g/mol$

8) $P_T = P_{He} + P_{Ne} + P_{Ar} \cdots$

$P_T = 662$ Torr
$P_{He} = 341$ Torr
$P_{Ne} = 112$ Torr
$P_{Ar} = ?$

$P_{Ar} = P_T - P_{He} - P_{Ne} = 662_{Torr} - 341_{Torr} - 112_{Torr}$

$\boxed{P_{Ar} = 209 \text{ Torr}}$

9) $P_T = 1 \text{ atm} = 760 \text{ Torr}$

$P_{N_2} + P_{O_2} + P_{CO_2} + P_{H_2O} = 760 \text{ Torr}$

% Partial pressure = % Volume = % mol

% Partial pressure $O_2 = \frac{100}{760} \times 100 = 13.2\%$

$\therefore$ % Volume = % mol = $\boxed{13.2\%}$