# Combined Gas Law Problems

1) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(12\text{ atm})(23\text{ L})}{200\text{K}} = \frac{(14\text{ atm})V_2}{300\text{K}}$ $\quad V = 29.6\text{ L}$

2) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(2.3\text{ atm})(17\text{ L})}{299\text{K}} = \frac{(1.5\text{ atm})V_2}{350\text{K}}$ $\quad V = 30.5\text{ L}$

3) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{P_1(28\text{L})}{318\text{K}} = \frac{(2.0\text{ atm})(34\text{L})}{308\text{K}}$ $\quad P = 2.5\text{ atm}$

$45^\circ\text{C} + 273 = 318\text{K}$

$35^\circ\text{C} + 273 = 308\text{K}$

4) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{4.5\text{L}}{287\text{K}} = \frac{V}{302\text{K}}$ $\quad V = 4.7\text{ L}$

$14^\circ\text{C} + 273 = 287\text{K}$

$29^\circ\text{C} + 273 = 302\text{K}$

5) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(88.89\text{ atm})(17\text{L})}{340\text{K}} = \frac{P(12\text{L})}{367\text{K}}$ $\quad P = 136\text{ atm}$

$67^\circ\text{C} + 273 = 340\text{K}$

$94^\circ\text{C} + 273 = 367\text{K}$

6) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(0.5\text{ atm})V}{325\text{k}} = \frac{(1.2\text{ atm})(48\text{L})}{320\text{k}}$ $\quad V = 117\text{ L}$

7) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(78\text{ atm})(21\text{L})}{900\text{K}} = \frac{(45\text{ atm})V}{750\text{K}}$ $\quad V = 30.3\text{ L}$

8) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(5\text{ atm})(2.9\text{L})}{323\text{k}} = \frac{(3\text{ atm})(2.4\text{L})}{T}$ $\quad T = 160\text{K or } -113^\circ\text{C}$

$50^\circ\text{C} + 273 = 323\text{k}$

9) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad \frac{(60\text{ atm})V}{115\text{K}} = \frac{(30\text{ atm})(29\text{L})}{225\text{k}}$ $\quad V = 7.4\text{ L}$