(6) 1. Suppose 3.41 l of oxygen is needed at atmospheric pressure and a temperature of 20 C. What volume of oxygen should be collected at 230 C and the same pressure in order to give this volume when cooled?

\[ P_1 = \text{atm} \quad P_2 = \text{atm} \]
\[ V_1 = x \quad V_2 = 3.41 \, \text{l} \]
\[ T_1 = 230^\circ \text{C} + 273 = 503 \, \text{K} \quad T_2 = 20^\circ \text{C} + 273 = 293 \, \text{K} \]

\[ \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \]

\[ V_1 = V_2 \left( \frac{P_2}{P_1} \right) \left( \frac{T_1}{T_2} \right) \]

\[ = \left(3.41 \, \text{l}\right) \left( \frac{503 \, \text{K}}{293 \, \text{K}} \right) \]

\[ V_1 = 5.85 \, \text{l} \]

(4) 2. Complete the following chemical reactions and balance the equation.

\[ \text{PbCO}_3 \rightarrow \text{PbO} + \text{CO}_2 \]

\[ \begin{cases} \text{CaCO}_3 (\text{s}) + 2 \text{HBr (aq)} \rightarrow \text{CaBr}_2 + \text{H}_2\text{CO}_3 \\ \text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2 \end{cases} \]

OR

\[ = \text{CaCO}_3 + 2\text{HBr} \rightarrow \text{CaBr}_2 + \text{H}_2\text{O} + \text{CO}_2 \]