

Task #81511

A sample of a gas occupies 5.0 L at STP. What will the volume be if the temperature is set to 320 K at a pressure of 1.2 atm?

Solution.

We write the Mendeleev-Clayperon equation for non-standard conditions.

$$\frac{P_1 \cdot V_1}{T_1} = \frac{P_2 \cdot V_2}{T_2}, \text{ where } P_1, V_1, T_1 = \text{STP}$$

$$\text{So, } V_2 = P_1 \cdot V_1 \cdot T_2 / P_2 \cdot T_1$$

$$V_2 = 1,013 \cdot 10^5 \cdot 5 \cdot 320 / 121590 \cdot 273 = 4.883 \text{ L}$$

Answer:

$$V_2 = 4.883 \text{ L}$$