

Physics 102
Quiz # 4
Chapter 20

Name: Solution

Id: _____

Sec. #: _____

An ideal gas initially at 300 K is compressed at a constant pressure of 25 N/m² from a volume of 3.0 m³ to a volume of 1.8 m³. What is the final temperature of the gas?

The gas is compressed at constant pressure
i.e

$$P_f = P_i$$

But

$$P = \frac{nRT}{V}$$

$$\Rightarrow \frac{nRT_i}{V_i} = \frac{nRT_f}{V_f}$$

$$\begin{aligned} \Rightarrow T_f &= T_i \left(\frac{V_f}{V_i} \right) \\ &= 300 \times \left(\frac{1.8}{3} \right) \end{aligned}$$

$$\Rightarrow \boxed{T_f = 180 \text{ K}}$$