

Allen

$$3.6-2. \quad U = bVT^4, \quad \frac{P}{T} = \frac{1}{3} b^{3/4} \left(\frac{U}{V}\right)^{3/4}$$

$$\Rightarrow \frac{U}{V} = bT^4, \quad \frac{P}{T} = \frac{1}{3} b^{3/4} (bT^4)^{3/4} T$$

$$= \frac{1}{3} b^{3/4} b^{3/4} T^3 T$$

$$= \boxed{\frac{1}{3} b T^4}$$

$$P = \frac{1}{3} \frac{7.56 \times 10^{-16} \text{ J}}{\text{m}^3} (2.7)^4 \text{ K}^4$$

$$\approx \frac{1.34 \times 10^{-16} \text{ J}}{\text{m}^3} = \frac{1.34 \times 10^{-14} \text{ N} \cdot \text{m}}{\text{m}^3}$$

$$= 1.34 \times 10^{-14} \text{ Pascal.}$$

$$\approx 10^{-9} \text{ atm.}$$