21. First we rewrite Eq. 20-22 using Eq. 20-4 and Eq. 20-7:

$$v_{\text{rms}} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3\,(kN_{\text{A}})\,T}{(m\,N_{\text{A}})}} = \sqrt{\frac{3kT}{M}}\ .$$

The mass of the electron is given in the problem, and $k = 1.38 \times 10^{-23}$ J/K is given in the textbook. With $T = 2.00 \times 10^{6}$ K, the above expression gives $v_{\text{rms}} = 9.53 \times 10^{6}$ m/s. The pressure value given in the problem is not used in the solution.