Pb # 10. Ag $\rho = 10.5 \times 10^3 \text{ kg/m}^3 = 10.5 \text{ g/cm}^3$

$\rho = 1.6 \times 10^{-8} \Omega.\text{m}$

a) from eq. 11.13 $\Rightarrow \frac{1}{\rho} = \frac{ne^2\tau}{m_e} \Rightarrow \tau = \frac{m_e}{\rho n e^2}$

$n = 1 \times 6.02 \times 10^{23} \times \frac{10.5}{108} = 5.85 \times 10^{22} \text{ e}^-/\text{cm}^3$

$= 5.86 \times 10^{28} \text{ e}^-/\text{m}^3$

$\tau = \frac{9.1 \times 10^{-31}}{(1.6\times10^{-8})(5.86\times10^{28})(1.6\times10^{-19})^2} = \boxed{3.8 \times 10^{-14} \text{ s}}$

b) $v_{rms} = \sqrt{\frac{3k_B T}{m_e}} = 1.17 \times 10^5 \text{ m/s}$ at $T = 300\text{K}$

$L = v_{rms}\,\tau = 4.4 \times 10^{-9} \text{ m} \simeq 44 \text{ Å}$

(c) $\sim$ 20 lattice spacings.

Pb # 11.