Glazer & Marks.

7.5. At 1 keV, density of $10^{33}\ m^{-3}$, is electron Fermi-Dirac or Maxwell-Boltzmann?

$\rho = 10^{33}\ m^{-3}$, $m = 0.5\times10^{6}\ eV/c^2$,

$k_B T = 10^3\ eV$,

$h = 4.14\times10^{-15}\ eV\,s$.

$$\Rightarrow \frac{V}{N}\left(\frac{2\pi m k_B T}{h^2}\right)^{3/2}$$

$$\simeq \frac{1}{\rho}\left(\frac{6\times0.5\times10^{6}\,eV\times10^{3}\,eV\times s^2}{c^2\,m^2\times(4.14\times10^{-15})^2\,eV^2 s^2}\right)^{3/2}$$

$$= \frac{m^3}{10^{33}}\left(\frac{3\times10^{6}\times10^{3}\times \cancel{eV^2}\times \cancel{s^2}}{(3\times10^{8})^2\times(4.14\times10^{-15})^2\times \cancel{eV^2}\times \cancel{s^2}\times m^2}\right)^{3/2}$$

$$\simeq \frac{m^3}{10^{33}}\left(\frac{3\times10^{9}}{10^{17}\times10^{-29}\ m^2}\right)^{3/2}$$

$$\simeq \frac{\cancel{m^3}}{10^{33}}\left(3\times10^{21}\right)^{3/2} \simeq 10^{-1.5}$$

since $10^{-1.5}$ is not greatly larger than 1, we can not use Maxwell-Boltzmann Dist.