

35. From Eq. 38-49, $\gamma = (K/mc^2) + 1$, and from Eq. 38-8, the speed parameter is $\beta = \sqrt{1 - (1/\gamma)^2}$. Table 38-3 gives $m_e c^2 = 511 \text{ keV} = 0.511 \text{ MeV}$, so the Lorentz factor is

$$\gamma = \frac{100 \text{ MeV}}{0.511 \text{ MeV}} + 1 = 197 ,$$

and the speed parameter is

$$\beta = \sqrt{1 - \frac{1}{(197)^2}} = 0.999987 .$$

Thus, the speed of the electron is $0.999987c$, or 99.9987% of the speed of light. The discussion in Sample Problem 38-7 dealing with these sorts of values may prove helpful for those whose calculators do not yield this answer.