26.61

According to the problem statement E, the total energy of the particle of rest mass m, is twice as much as E_0, its rest energy: $E = \gamma mc^2 = 2.000 E_0 = 2.000\, mc^2$, where we used Eq. (26.13). Thus $\gamma = 1/\sqrt{1 - v^2/c^2} = E/E_0 = 2.000$, which we solve for v, the speed of the particle:

$$v = c\sqrt{1 - \frac{1}{\gamma^2}} = c\sqrt{1 - \frac{1}{(2.000)^2}} = 0.8660\, c\,.$$

The kinetic energy is the difference between the total energy E and the rest energy E_0 of the particle: $KE = E - E_0 = 2E_0 - E_0 = E_0 = 1000\,\text{MeV}$.

26.63

According to Eq. (26.12), the total energy E is the sum of the kinetic energy KE and the rest energy E_0: $E = KE + E_0$. Since the total energy of the muon is $E = 106.7\,\text{MeV}$ while its rest energy is $E_0 = 105.7\,\text{MeV}$, the kinetic energy of the muon must be $KE = E - E_0 = 106.7\,\text{MeV} - 105.7\,\text{MeV} = 1.0\,\text{MeV}$.