2.19) a), b) $\Delta mc^2 = m(^4He)c^2 - 2m(^1H)c^2$

$= (3727.38 - 2 \times 1875.61)\,MeV$

$= -23.8\,MeV$

$1u = 931\,MeV/c^2$ ⇒ $\Delta m = -0.025\,u$

c) $P = \frac{E}{t} = \frac{N \Delta mc^2}{t}$

$N = \frac{Pt}{\Delta mc^2} = \frac{1W \cdot 1s}{23.8\,MeV} = \frac{1\,J}{23.8\,MeV}$

$= \frac{1\,J}{1.6 \cdot 10^{-19}\,J} \frac{1\,eV}{23.8 \times 10^6\,eV} = 2.6 \times 10^{11}$

2.29) $p = 500\,MeV/c$

$E = 1746\,MeV$

$E^2 = p^2c^2 + m^2c^4$ ⇒ $mc^2 = \sqrt{E^2 - p^2c^2} = 1673\,MeV$

$E = \gamma mc^2$ ⇒ $\gamma = \frac{1746}{1673}$

$\frac{v}{c} = \sqrt{1 - \frac{1}{\gamma^2}} = 0.286$