

Ejercicio n° 12. T1.

Datos

$$E = 4'5 \cdot 10^{13} \text{ J}$$

$$c = 300.000 \frac{\text{km}}{\text{s}} = 3 \cdot 10^9 \frac{\text{m}}{\text{s}}$$

$$\eta = 30\%$$

$$\begin{aligned} \text{a) } E = mc^2 &\Rightarrow m = \frac{E}{c^2} = \frac{4'5 \cdot 10^{13}}{9 \cdot 10^{16}} \\ &= 5 \cdot 10^{-4} \text{ kg} = 0'5 \text{ g} \end{aligned}$$

$$\begin{aligned} \text{b) } \eta &= \frac{E_{\text{útil}}}{E_{\text{total}}} \cdot 100 \Rightarrow E_{\text{total}} = \frac{E_{\text{útil}} \cdot 100}{\eta} \\ &= 1'5 \cdot 10^{14} \text{ J} \end{aligned}$$

$$E_T = m'c^2 \Rightarrow m' = \frac{E_{\text{total}}}{c^2} = \frac{1'5 \cdot 10^{14}}{9 \cdot 10^{16}} = 1'66 \cdot 10^{-3} \text{ kg} = 1'66 \text{ g}$$