(3.1) Calculate the nucleon binding energy in ^{24}Mg from the atomic mass excess value in Table 3.1.

First we define some useful units and constants:

$amu := 1.6605402 \cdot 10^{-27} \cdot kg$ $\quad MeV := 1.60217733 \cdot 10^{-13} \cdot joule$

Then we have for ^{24}Mg:

$A := 24$ $\quad Z := 12$

$\delta_A := -14958 \cdot 10^{-6} \cdot amu$ $\quad M_{Mg} := 24 \cdot amu + \delta_A$ from eqn. (3.4) $\quad M_{Mg} = 3.982813 \cdot 10^{-26} \cdot \text{kg}$

$M_{Mg} = 23.985042 \cdot amu$

$N := A - Z$ (eqn. (2.1))

$M_H := 1.007825 \cdot amu$ $\quad M_n := 1.008665 \cdot amu$ (Data from Table 3.1)

$\Delta M_A := M_{Mg} - Z \cdot M_H - N \cdot M_n$ (eqn. (3.2)) $\quad \Delta M_A = -0.213 \cdot amu$

$E_B := -931.5 \cdot \frac{MeV}{amu} \cdot \Delta M_A$ (eqn. (3.5)) $\quad E_B = 198.259 \cdot MeV$

$\frac{E_B}{A} = 8.261 \cdot MeV$ per A (p. 47. last section)