

NCEA Level 3 Physics (Modern Physics)

Reading

https://www.youtube.com/watch?v=XYcw8nV_GTs

Questions

Useful data: $c \approx 2.99 \times 10^8 \text{ m s}^{-1}$, $h \approx 6.63 \times 10^{-34} \text{ J s}$, $e \approx 1.6 \times 10^{-19} \text{ C}$, $1 \text{ eV} \approx 1.6 \times 10^{-19} \text{ J}$, $1 \text{ u} \approx 1.661 \times 10^{-27} \text{ kg}$, $m_{\text{proton}} = 1.007283 \text{ u}$, $m_{\text{neutron}} = 1.008665 \text{ u}$.

1. Find the binding energy per nucleon of erbium-167.
2. Find the total energy released if three ^4He nuclei fuse together to form one ^{12}C nucleus.
3. The binding energy of the electron in a hydrogen atom is 13.6 eV. By how much does the mass decrease when a hydrogen atom is formed from a proton and an electron, as a percentage of the mass of the hydrogen atom?