Answers to Problem 2

(a) (i) By *nucleaon*, we meant a particle that constitutes the *nucleus* (proton or neutron)

(ii) These nucei are of two different isotopes of Argon, therefore they have different number of neutrons but the same number of proton. That means the balance between the electrostatic repulsive force (between the protons) and the attractive strong nuclear force (between all the nucleons) is different.

(b) (i) Z = 19 protons ; N = 39 neutrons.

(ii) $\Delta m = 0.00061u = 0.00061 \times 1.6605 \times 10^{-27}\,\text{kg} = 1.013 \times 10^{-30}\,\text{kg}$

$\Delta E = mc^2 = 1.013 \times 10^{-30} \times (3 \times 10^8)^2 = 9.11 \times 10^{-14} J.$

(c) Half-life of Argon-39: $T_{\frac{1}{2}} = 270 \pm 10$ years.

That is because its seems to diminue of a ratio $\frac{1600}{100} = 16 = 2^4$ is 11×10^2 years

Then $T_{\frac{1}{2}} \cong \frac{1100}{4} = 265$ years.