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Suppose we think of fission of $_{26}Fe^{56}$ nucleus into two equal fragments $_{13}Al^{28}$. Is the fission energetically possible? Argue by working out the Q of the process.
Given: m($_{26}Fe^{56}$) = 55.93494 a.m.u., and m($_{13}Al^{28}$) = 27.98191 a.m.u.

Solution :-

$$_{26}Fe^{56} \rightarrow {}_{13}Al^{28} + {}_{13}Al^{28} + Q$$

$$\therefore Q = \left[m\left(_{26}Fe^{56}\right) - 2m\left(_{13}Al^{28}\right)\right] \times 931.5 \text{ MeV}$$

$$\therefore Q = \left[55.93494 - 2 \times 27.98191\right] \times 931.5$$

$$\therefore Q = -0.02888 \times 931.5$$

$$\therefore Q = -26.9 \text{ MeV}$$

Since the Q-value is negative, the fission of $_{26}Fe^{56}$ into two $_{13}Al^{28}$ nuclei is energetically not possible.

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