Problem-1

Given the mass of iron nucleus as 55.85u and A = 56, find the nuclear density?

Solution:-

$$m = 55.85u$$

$$1u = 1.660539 \times 10^{-27} \text{ Kg}$$

$\therefore$ Total mass of nucleus

$$= 55.85 \times 1.660539 \times 10^{-27}$$

$$= 9.27 \times 10^{-26} \text{ kg}$$

$\therefore$ Nuclear density

$$\rho = \frac{\text{mass}}{\text{volume}} = \frac{\text{mass}}{\frac{4}{3}\pi R^3}$$

$$\therefore \rho = \frac{9.27 \times 10^{-26} \times 3}{4 \times 3.14 \times \left(1.2 \times 10^{-15} \times 56^{1/3}\right)^3}$$

$$\therefore \rho = 2.29 \times 10^{17} \frac{\text{Kg}}{m^3}$$

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