QUIZ#1- CHAPTER 1
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The average radius of a nucleus is R = 10.0 fm. Find the density of the nucleus which has a mass of 15u [1 fm = 10^{-15} m, 1 u = 1.66×10^{-27}kg].

$$\rho = \frac{m}{V} = \frac{m}{\frac{4}{3}\pi R^3} = \frac{3\times 15u}{4\pi(10\,fm)^3}$$

$$\frac{3\times 15\,\cancel{u}}{4\pi(10\,\cancel{fm})^3}\left(\frac{1.66\times10^{-27}\,kg}{1\,\cancel{u}}\right)\left(\frac{1\,\cancel{fm}}{10^{-15}\,m}\right)^3$$

$$= \frac{3\times 15\times 1.66\times10^{-27}}{4\pi\times(10)^3\times(10^{-15})^3} = \frac{7.47\times10^{-26}}{1.257\times10^{-41}}$$

$$\boxed{\rho = 5.94\times10^{15}\ kg/m^3}$$

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The acceleration of a particle moving along the x-axis depends on time (t) according to the equation: $a(t) = At - (A/B)t^3$. What are the dimensions of A and B?

$$[a] = \frac{L}{T^2}$$

$$\frac{L}{T^2} = [A]\,T \Rightarrow [A] = \frac{L}{T^3}$$

$$\frac{L}{T^2} = \frac{[A]}{[B]}\,T^3 = \frac{L}{T^3[B]}\,T^3$$

$$\Rightarrow \boxed{[B] = T^2}$$

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The pressure, P, is a physical quantity defined as: P = F/A, where F is force, and A is the area of the surface on which F is applied. Find the dimension of P.

$$[P] = \frac{[F]}{[A]} \qquad F = ma$$

$$[A] = L^2$$

$$[F] = M\frac{L}{T^2}$$

$$[P] = \frac{M\cancel{L}}{T^2 L^{\cancel{3}}} = \frac{M}{LT^2}$$