

- 8 (a) State the quantities, other than momentum, that are conserved in a nuclear reaction.

.....
.....

[2]

- (b) A stationary nucleus of uranium-238 decays to a nucleus of thorium-234 by emitting an α -particle. The kinetic energy of the α -particle is 6.69×10^{-13} J.

- (i) Show that the kinetic energy E_k of a mass m is related to its momentum p by the equation

$$E_k = \frac{p^2}{2m} .$$

[1]

- (ii) Use the conservation of momentum to determine the kinetic energy, in keV, of the thorium nucleus.

kinetic energy = keV [3]

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