

- 13 Thorium is an unstable isotope that decays into radium as shown in the nuclear equation.



The table below gives the masses of the nuclei.

Nucleus	Mass / u
${}^{228}\text{Th}$	228.02873
${}^{224}\text{Ra}$	224.02021
${}^4\alpha$	4.00260

- (a) Show that the energy released in the decay is about 5.5 MeV.

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- (b) A textbook states that the kinetic energy gained by the alpha particle when a nucleus of thorium-228 decays is equal to 5.4 MeV.

Comment on this statement. Your answer should include a calculation.

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(Total for Question 13 = 8 marks)