

## **A Level Physics A**

**H556/03** Unified physics

**Question Set 1**

1

A stationary uranium-238 nucleus ( ${}^{238}_{92}\text{U}$ ) decays into a nucleus of thorium-234 by emitting an alpha-particle.

(a) The chemical symbol for thorium is Th. Write a nuclear equation for this decay.

[2]

(b) The mass of the uranium nucleus is  $4.0 \times 10^{-25}$  kg. After the decay the thorium nucleus has a speed of  $2.4 \times 10^5$  ms<sup>-1</sup>.

Calculate the kinetic energy, in MeV, of the alpha-particle.

kinetic energy = .....MeV [4]

(c) The uranium-238 ( ${}^{238}_{92}\text{U}$ ) nucleus starts the decay chain which ends with a nucleus of lead-206 ( ${}^{206}_{82}\text{Pb}$ ).

Show that 14 particles are emitted during this decay chain. Explain your reasoning.

[3]

**Total Marks for Question Set 1: 9**

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