

- 7 (a) The radioactive decay of some nuclei gives rise to the emission of α -particles.
State

- (i) what is meant by an α -particle,

.....[1]

- (ii) two properties of α -particles.

1.

.....

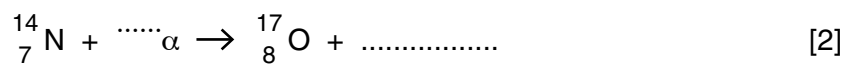
2.

.....

[2]

- (b) One possible nuclear reaction involves the bombardment of a stationary nitrogen-14 nucleus by an α -particle to form oxygen-17 and another particle.

- (i) Complete the nuclear equation for this reaction.



- (ii) The total mass-energy of the nitrogen-14 nucleus and the α -particle is less than that of the particles resulting from the reaction. This mass-energy difference is 1.1 MeV.

1. Suggest how it is possible for mass-energy to be conserved in this reaction.

.....

.....[1]

2. Calculate the speed of an α -particle having kinetic energy of 1.1 MeV.

speed = m s^{-1} [4]

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