

- 8 An isolated stationary nucleus X decays by emitting an  $\alpha$ -particle to form a nucleus Y.

Nucleus Y and nucleus Z are isotopes of the same element.

- (a) By comparing the number of protons in each nucleus, state and explain whether the charge of nucleus Y is less than, greater than or the same as the charge of:

(i) nucleus Z

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..... [1]

(ii) nucleus X.

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..... [2]

- (b) Use the principle of conservation of momentum to explain why nucleus Y cannot be stationary immediately after the decay of nucleus X.

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..... [2]