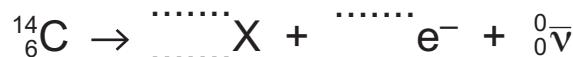


- 6 (a) The nuclide $^{14}_6\text{C}$ (carbon-14) is unstable and undergoes β^- decay, emitting a high-energy electron and an antineutrino to form a new nuclide X. The equation for this decay is shown.



Complete the equation.

[2]

- (b) (i) State the equation for β^- decay in terms of the fundamental particles involved.

[1]

- (ii) Use your equation from (b)(i) to show how charge is conserved in β^- decay.

[1]

- (c) Neutrinos were first proposed to exist more than 20 years before they were directly detected, in order to explain a particular experimental observation about β -decay.

- (i) State an observation about β -decay that is explained by the existence of neutrinos.

.....
.....
.....

[1]

- (ii) Suggest how the existence of neutrinos explains the observation in (c)(i).

.....
.....
.....

[1]