11 A stationary isolated nucleus emits a γ-ray photon of energy 0.51 MeV.

(a) State what is meant by a *photon*.

.....

.....

.....[2]

(b) For the γ-ray photon, calculate

(i) its wavelength,

wavelength = ... m [2]

(ii) its momentum.

momentum = ...N s [2]

(c) **(i)** For this nucleus, determine the change in mass Δm during the decay that gives rise to the energy of the γ-ray photon.

$\Delta m =$ ..... kg [2]

(ii) Explain why, after the decay, the nucleus is no longer stationary.

.....

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.....[1]

[Total: 9]