Question number	Answer		Mark
12 (a)	annihilation	1	(1)
12 (b)	• Use of $\Delta E = c^2 \Delta m$ • Use $E = hf$ • Use of $c = f\lambda$ • $\lambda = 2.4 \times 10^{-12}$ m Example of equation $\Delta E = (3.00 \times 10^8 \text{ m s}^{-1})^2 \times 2 \times 9.11 \times 10^{-31}$ kg $f = 1.64 \times 10^{-13}$ J / 6.63×10^{-34} J s $\times 2$ $\lambda = 3.00 \times 10^8$ m s^{-1} / 1.24×10^{20} Hz $\lambda = 2.42 \times 10^{-12}$ m	1 1 1 1	(4)
	Total for question 12		5