Question			Answer	Max mark	Additional guidance
9.	(b)	(ii)	Mass before: $5{\cdot}008 \times 10^{-27} + 3{\cdot}344 \times 10^{-27}$ $= 8{\cdot}352 \times 10^{-27}$ Mass after: $6{\cdot}646 \times 10^{-27} + 1{\cdot}673 \times 10^{-27}$ $= 8{\cdot}319 \times 10^{-27}$ Mass "lost": $0{\cdot}033 \times 10^{-27}$ (kg) 1 $E = mc^2$ 1 $E = 0{\cdot}033 \times 10^{-27} \times (3{\cdot}00 \times 10^{8})^2$ 1 $E = 2{\cdot}97 \times 10^{-12}$ J 1	**4**	$E = mc^2$ anywhere, 1 mark. Accept: 3·0, 2·970, 2·9700 Do not accept 3. Check for correct substitutions of values in calculation of mass "lost". If values are incorrect, maximum 1 mark for formula, even if final answer is correct. If mass before and after not used to 4 significant figures from table then stop marking - maximum 1 mark for formula. Ignore inappropriate reference to mass defect. Arithmetic mistake can be carried forward. Truncation error in mass before and/or mass after – maximum 1 mark for formula. If finding $E = mc^2$ for each particle, then $E = mc^2$ **1** All substitutions **1** Subtraction **1** Final answer **1**