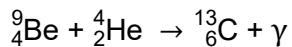


- 6 (a) State what is meant by nuclear fusion.

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[2]

- (b) When beryllium is bombarded with α -particles of energy 8.0×10^{-13} J, carbon atoms are produced, together with a very penetrating radiation. The nuclear reaction might be



- (i) Explain what is meant by ${}^{13}_6\text{C}$ in relation to carbon-12.

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[2]

- (ii) The energy of the penetrating radiation is found to be at least 8.8×10^{-12} J for each γ produced.

Data for the nuclei in the reaction are given in Table 6.1.

Table 6.1

nuclide	rest mass/ u
${}^9_4\text{Be}$	9.0150
${}^4_2\text{He}$	4.0010
${}^{13}_6\text{C}$	13.0075

1. Calculate the initial rest mass energy of reactants.

initial rest mass energy = J [2]

[Turn over

2. Calculate the final rest mass energy of products.

final rest mass energy = J [1]

3. Determine the energy released from the reaction.

energy released = J [2]

4. Based on b(ii)3., explain why the nuclear equation suggested in (b) cannot be valid.

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[1]