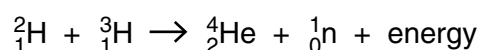


- 9 One likely means by which nuclear fusion may be achieved on a practical scale is the D-T reaction.

(a) State what is meant by *nuclear fusion*.

.....
 [1]

- (b) In the D-T reaction, a deuterium (${}^2_1\text{H}$) nucleus fuses with a tritium (${}^3_1\text{H}$) nucleus to form a helium-4 (${}^4_2\text{He}$) nucleus. The nuclear equation for the reaction is



Some data for this reaction are given in Fig. 9.1.

	mass/u
deuterium (${}^2_1\text{H}$)	2.01356
tritium (${}^3_1\text{H}$)	3.01551
helium-4 (${}^4_2\text{He}$)	4.00151
neutron (${}^1_0\text{n}$)	1.00867

Fig. 9.1

- (i) Calculate the energy, in MeV, equivalent to 1.00u. Explain your working.

energy = MeV [3]

- (ii) Use data from Fig. 9.1 and your answer in (i) to determine the energy released in this D-T reaction.

energy = MeV [2]

- (iii) Suggest why, for the D-T reaction to take place, the temperature of the deuterium and the tritium must be high.

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..... [2]