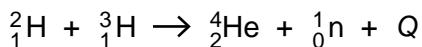


- 8 The controlled reaction between deuterium (${}_1^2\text{H}$) and tritium (${}_1^3\text{H}$) has involved ongoing research for many years. The reaction may be summarised as



where $Q = 17.7\text{ MeV}$.

Binding energies per nucleon are shown in Fig. 8.1.

	binding energy per nucleon /MeV
${}_1^2\text{H}$	1.12
${}_0^1\text{n}$	—
${}_2^4\text{He}$	7.07

Fig. 8.1

- (a) Suggest why binding energy per nucleon for the neutron is not quoted.

..... [1]

- (b) Calculate the mass defect, in kg, of a helium ${}_2^4\text{He}$ nucleus.

$$\text{mass defect} = \dots \text{kg} \quad [3]$$

- (c) (i) State the name of the type of reaction illustrated by this nuclear equation.

..... [1]

- (ii) Determine the binding energy per nucleon, in MeV, of tritium (${}_1^3\text{H}$).

$$\text{binding energy per nucleon} = \dots \text{MeV} \quad [3]$$