8. The Sun emits energy at an average rate of $4{\cdot}1 \times 10^{26}\,J\,s^{-1}$. This energy is produced by nuclear reactions taking place inside the Sun.

The following statement shows one reaction that takes place inside the Sun.

$$^{2}_{1}H + {}^{2}_{1}H \rightarrow {}^{3}_{2}He + {}^{1}_{0}n$$

(a) State the name given to this type of nuclear reaction. **1**

(b) The mass of the particles involved in this reaction are shown in the table.

Particle	Mass (kg)
$^{2}_{1}H$	$3{\cdot}3436 \times 10^{-27}$
$^{3}_{2}He$	$5{\cdot}0082 \times 10^{-27}$
$^{1}_{0}n$	$1{\cdot}6749 \times 10^{-27}$

Determine the energy released in this reaction. **4**

Space for working and answer

8. (continued)

(c) Determine the number of these reactions that would be required per second to produce the Sun's average energy output. **2**

Space for working and answer

[Turn over