

- 6 (a)  $\beta$ -radiation is emitted during the spontaneous radioactive decay of an unstable nucleus.

(i) State the nature of a  $\beta$ -particle.

..... [1]

(ii) State two properties of  $\beta$ -radiation.

1. ....

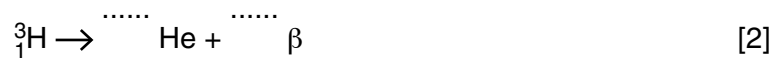
2. .... [2]

(iii) Explain the meaning of *spontaneous radioactive decay*.

..... [1]  
.....

- (b) The following equation represents the decay of a nucleus of hydrogen-3 by the emission of a  $\beta$ -particle.

Complete the equation.



- (c) The  $\beta$ -particle is emitted with an energy of  $5.7 \times 10^3 \text{ eV}$ .

Calculate the speed of the  $\beta$ -particle.

speed = .....  $\text{ms}^{-1}$  [3]

- (d) A different isotope of hydrogen is hydrogen-2 (deuterium). Describe the similarities and differences between the atoms of hydrogen-2 and hydrogen-3.

..... [2]  
.....  
.....

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