

- 2 A tritium nucleus moves towards a deuterium nucleus as illustrated in Fig. 2.1



Fig. 2.1

The nuclei initially have the same speed v . The tritium nucleus consists of two neutrons and a proton. The deuterium nucleus consists of a neutron and a proton. The proton and the neutron each have the same mass m . The collision is elastic.

- (a) State the *principle of conservation of momentum*.

.....

[2]

- (b) At one instant during the collision between the nuclei, they are both travelling **in the same direction** with the same speed.

Calculate this speed, in terms of v .

speed = v [2]

- (c) Explain why it is **not** possible for the nuclei to stop at the same instant during the interaction.

.....

[2]

(d) Determine the final speed of each nucleus in terms of v .

speed of deuterium = v

speed of tritium = v [4]

[Total: 10]

