



- 5 (a) (i) Write the nuclear equation for the reaction when a nucleus of deuterium (${}^2_1\text{H}$) collides with a mercury nucleus (${}^{198}_{80}\text{Hg}$) to form a gold nucleus (${}^{196}_{79}\text{Au}$) and another particle.

[2]

- (ii) State the name of the other particle.

..... [1]

- (b) (i) Table 5.1 shows the masses of the particles in (a)(i).

Table 5.1

| particle | mass/u |
|--------------------------|-----------|
| ${}^2_1\text{H}$ | 2.014 u |
| ${}^{198}_{80}\text{Hg}$ | 197.967 u |
| ${}^{196}_{79}\text{Au}$ | 195.966 u |
| the other particle | 4.002 u |

Deduce the energy change during the reaction.

energy change = J [4]

- (ii) Suggest why this reaction is not used commercially to make gold from the much cheaper mercury.
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[2]

[Total: 9]



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Please turn over for question 6.

