

5 (a) (i) State what is meant by nuclear binding energy.

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

(ii) On Fig. 5.1, sketch a line to show the variation with nucleon number A of the binding energy per nucleon E of a nucleus.

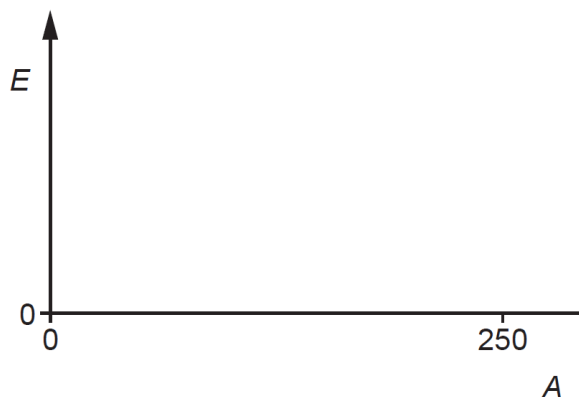
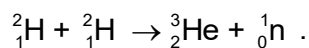


Fig. 5.1

[1]

(b) In one type of nuclear process, deuterium (${}^2_1\text{H}$) undergoes the reaction



(i) State the name of this type of nuclear process.

..... [1]

(ii) Explain, with reference to your line in (a)(ii), why this reaction results in the release of energy.

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

(c) Table 5.1 shows the masses of the particles involved in the reaction in (b).

Table 5.1

particle	mass/u
${}_0^1\text{n}$	1.008 665
${}_1^2\text{H}$	2.014 102
${}_2^3\text{He}$	3.016 029

Calculate the energy released when 1.00 mol of deuterium undergoes the reaction.

energy = J [5]