

12 (a) State what is meant by *nuclear fusion* and *nuclear fission*.

nuclear fusion:

.....

.....

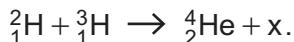
nuclear fission:

.....

.....

[3]

- (b) A nuclear reaction which may, in the future, be used for the generation of electrical energy is



- (i) Name the particle x.

..... [1]

- (ii) Data for the binding energy per nucleon E_B of some nuclei are given in Fig. 12.1.

	binding energy per nucleon $E_B/10^{-13}\text{J}$
deuterium ${}_1^2\text{H}$	1.7813
tritium ${}_1^3\text{H}$	4.5285
helium ${}_2^4\text{He}$	11.3290

Fig. 12.1

1. State the binding energy per nucleon of x.

binding energy per nucleon = J

2. Calculate the energy change that takes place in this reaction.

energy change = J
[3]

- (iii) Use your answer in (ii) part 2 to determine the energy release when 2.0 g of deuterium (${}_1^2\text{H}$) reacts with 3.0 g of tritium (${}_1^3\text{H}$).

energy = J [1]

[Total: 8]