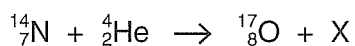


- 6 When an α -particle bombards a stationary nitrogen-14 nucleus, the following nuclear reaction may occur.



The rest masses of the nuclei are

${}^{14}_7\text{N}$,	14.007525 u
${}^4_2\text{He}$,	4.003860 u
${}^{17}_8\text{O}$,	17.004507 u
X,	1.008142 u

- (a) Identify the nucleus represented by the symbol X.

..... [1]

- (b) (i) Deduce that the change in rest-mass energy in this reaction is approximately $1.9 \times 10^{-13} \text{ J}$.

[2]

- (ii) By reference to energy, suggest how it is possible for this reaction to occur.

.....

 [2]

- (iii) The oxygen-17 nucleus and the nucleus X move apart after the reaction.

Describe the effect of this movement on your answer in (ii).

.....

 [2]