

Question 2

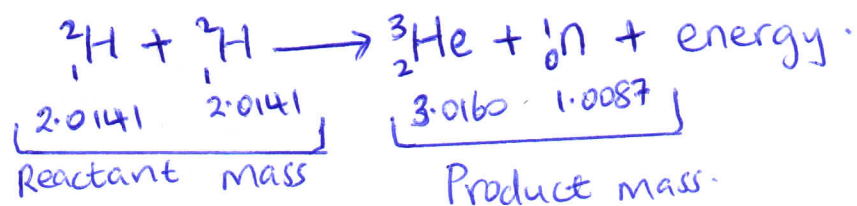
$$1 \text{ atomic mass unit} = 1.6605 \times 10^{-27} \text{ kg}$$

$${}^2_1\text{H} \text{ has a mass of } 2.0141 \text{ u}$$

$${}^1_0\text{n} \text{ has a mass of } 1.0087 \text{ u}$$

$${}^3_2\text{He} \text{ has a mass of } 3.0160 \text{ u}$$

Reaction Equation:



$$\text{Total Reactant mass} = 2.0141 + 2.0141 = 4.0282$$

$$\text{Total Product mass} = 3.0160 + 1.0087 = 4.0247$$

$$\begin{aligned} \text{Mass Defect} &= \text{Reactant mass} - \text{Product mass} \\ &= 4.0282 - 4.0247 \\ &= 0.0035 \end{aligned}$$

$$1 \text{ atomic mass} = 1.6605 \times 10^{-27} \text{ kg}$$

$$0.0035 = ?$$

$$\frac{0.0035 \times 1.6605 \times 10^{-27}}{1}$$

$$= 5.81175 \times 10^{-30} \text{ kg}$$

$$E = mc^2$$

Where E is energy

m is mass emitted

c is speed of light; 3.0×10^8

$$E = 5.81175 \times 10^{-30} \times (3.0 \times 10^8)^2$$

$$= 5.230575 \times 10^{-13} \text{ J}$$

$$= 5.230575 \times 10^{-13} \text{ J}$$

The correct answer is B.

Question 1

a) Frequency (F)

$$F = \frac{1}{T}$$

where; T is time taken to complete one periodic cycle.

from the graph;

$$\begin{array}{r} T = 0.04 \times 8 = 0.32 \\ + 0.01 \\ \hline 0.33 \end{array}$$

$$T = 0.33 \text{ seconds}$$

$$F = \frac{1}{T} = \frac{1}{0.33} = 3.0 \text{ Hz.}$$

b) Wavelength (λ)

$$F = \frac{v}{\lambda}$$

where; F is frequency

v is velocity

λ is wavelength

Therefore,

$$3 = \frac{3}{\lambda}$$

$$3 = 3\lambda$$

$$\lambda = 1.0 \text{ m.}$$

Correct Answer is B.