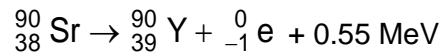


- 7 Strontium-90 decays with the emission of a β -particle to form Yttrium-90. The reaction is represented by the equation



The half-life of Strontium-90 is 27.7 years

- (a) Define *half-life*.

.....
 [1]

- (b) Suggest, with a reason, which nuclide ${}_{38}^{90}\text{Sr}$ or ${}_{39}^{90}\text{Y}$ has a greater binding energy.

.....

 [3]

- (c) At the time of purchase of a Strontium-90 source, the activity is $3.7 \times 10^6 \text{ Bq}$.

- (i) Calculate, for this sample of strontium,

1. the initial number of atoms,

initial number = [2]

2. the initial mass.

initial mass =kg [2]

(ii) Determine $\frac{A}{A_0}$, where A is the activity of the sample 5.0 years after purchase and A_0 is the initial activity.

$\frac{A}{A_0} = \dots\dots\dots$ [2]

[Total: 10]