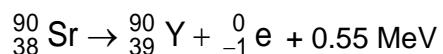


- 7 Strontium-90 decays with the emission of a  $\beta$ -particle to form Yttrium-90. The reaction is represented by the equation



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  $\frac{A}{A_o}$ , where  $A$  is the activity of the sample 5.0 years after purchase and  $A_o$  is the initial activity.

$$\frac{A}{A_o} = \dots \quad [2]$$

[Total: 10]