

**Mark scheme for Support Worksheet – Topic 6,
Worksheet 2**

1 Initial activity is 80 Bq and half of this is 40 Bq. [1]

This corresponds to a time of 0.6 minutes which is the half-life. [1]

2 a There is a probability of $\frac{1}{2}$ for **not** decaying in any interval equal to the half-life and so a probability of $\frac{1}{2} \times \frac{1}{2}$ for **not** decaying after two half-lives/there is always a non-zero probability of not decaying. [1]

b the nucleus may decay within the first half-life with probability $\frac{1}{2}$ or within the second with probability $\frac{1}{2} \times \frac{1}{2}$ [1]

The total probability is then $\frac{1}{2} + \frac{1}{2} \times \frac{1}{2} = \frac{3}{4}$. [1]

OR

Probability of **not** decaying after two half-lives is $\frac{1}{2} \times \frac{1}{2}$ [1]

And so probability of decaying is $1 - \frac{1}{2} \times \frac{1}{2} = \frac{3}{4}$. [1]

3 a Mass defect is the difference between the mass of the nucleons in a nucleus and the mass of the nucleus. [1]

b Binding energy of a nucleus is the minimum energy required to completely separate all the nucleons in the nucleus. [1]