Marks 4

- Balance the following nuclear reactions by identifying the missing nuclear particle or nuclide.

$$^{212}_{83}\text{Bi} \rightarrow {}^{208}_{81}\text{Tl} + \boxed{\mathbf{^{4}_{2}He}}$$

$$^{8}_{4}\text{Be} + \boxed{\mathbf{^{4}_{2}He}} \rightarrow {}^{12}_{6}\text{C}$$

$$^{14}_{7}\text{N} + {}^{1}_{0}\text{n} \rightarrow {}^{1}_{1}\text{p} + \boxed{\mathbf{^{14}_{6}C}}$$

What is a common source of the neutrons in the previous reaction?

Stars

2

- Explain why solid α emitters are generally considered as low risk radioisotopes while gaseous α emitters are high risk.

α-Radiation is highly ionising and causes severe tissue damage, but it is not very penetrating and easily stopped by our skin. Gaseous α-emitters are high risk as they can be breathed in and lodge in the lungs and then be transported round the body. Solid α-emitters are not dangerous unless ingested, which only happens in rare circumstances.