

Question number	Answer	Notes	Marks
7 (a)	<p>top line correct e.g. 228; bottom line correct e.g. 88 and 2; e.g.</p> $\begin{array}{ccc} \boxed{232} & & \boxed{228} \\ \text{Th} & \rightarrow & \text{Ra} \\ \boxed{90} & & \boxed{88} \end{array} + \begin{array}{c} \boxed{4} \\ \alpha \\ \boxed{2} \end{array}$		2
(b) (i)	idea that {alpha/beta} is {absorbed by / unable to penetrate} {aluminium / glass};	<p>allow stops / blocks for absorbs</p> <p>ignore references to paper, air, lead</p> <p>ignore references to gamma, unqualified 'radiation'</p>	1
(ii)	<p>any 2 of:</p> <p>MP1. idea of radiation being ionising;</p> <p>MP2. (radiation) causes cancer / cell mutation / kills cells / blindness;</p> <p>MP3. {alpha / beta} will travel this short distance (between lens and eye);</p> <p>MP4. idea that astronomer is likely to suffer prolonged exposure;</p>	<p>ignore references to gamma</p> <p>allow (eye) within penetrating range of {alpha / beta}</p>	2

Total 5 marks