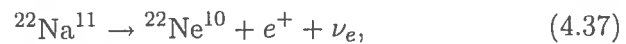
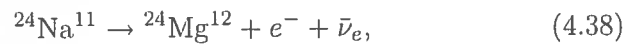


Problem 4.4 *If the stable isotope of sodium is ^{23}Na , what kind of radioactivity would you expect from (a) ^{22}Na and (b) ^{24}Na ?*

We know that $^{23}\text{Na}^{11}$ is stable. The isotope $^{22}\text{Na}^{11}$ has one less neutron, while $^{24}\text{Na}^{11}$ has one extra neutron relative to $^{23}\text{Na}^{11}$. Consequently, a proton in $^{22}\text{Na}^{11}$ can undergo an inverse β decay to yield



where $^{22}\text{Ne}^{10}$ is a naturally occurring stable isotope of $^{20}\text{Ne}^{10}$. Similarly, the extra neutron in $^{24}\text{Na}^{11}$ can undergo a β decay to yield



where $^{24}\text{Mg}^{12}$ is stable.