

Nuclear Equations

In every nuclear equation, the **mass number** and the **atomic (proton) number** are **conserved** — the totals on each side of the arrow must be equal.

The three types of decay

fill in the missing numbers

Alpha decay

 α — a helium nucleus
 mass number -4
 atomic number -2

Beta decay

 β — a fast electron
 mass number **unchanged**
 atomic number $+1$

Gamma emission

 γ — a wave, not a particle
 mass number **unchanged**
 atomic number **unchanged**

Complete each equation

[10 marks]



Exam-style question

[7 marks]

Bismuth-212 is unusual — some of its nuclei decay by **alpha** emission, and others decay by **beta** emission.

(a) Complete both decay equations.

(4)



(b) Compare what happens to the **atomic number** in the two decays, and explain why **each decay produces a different element** from bismuth.

(3)
