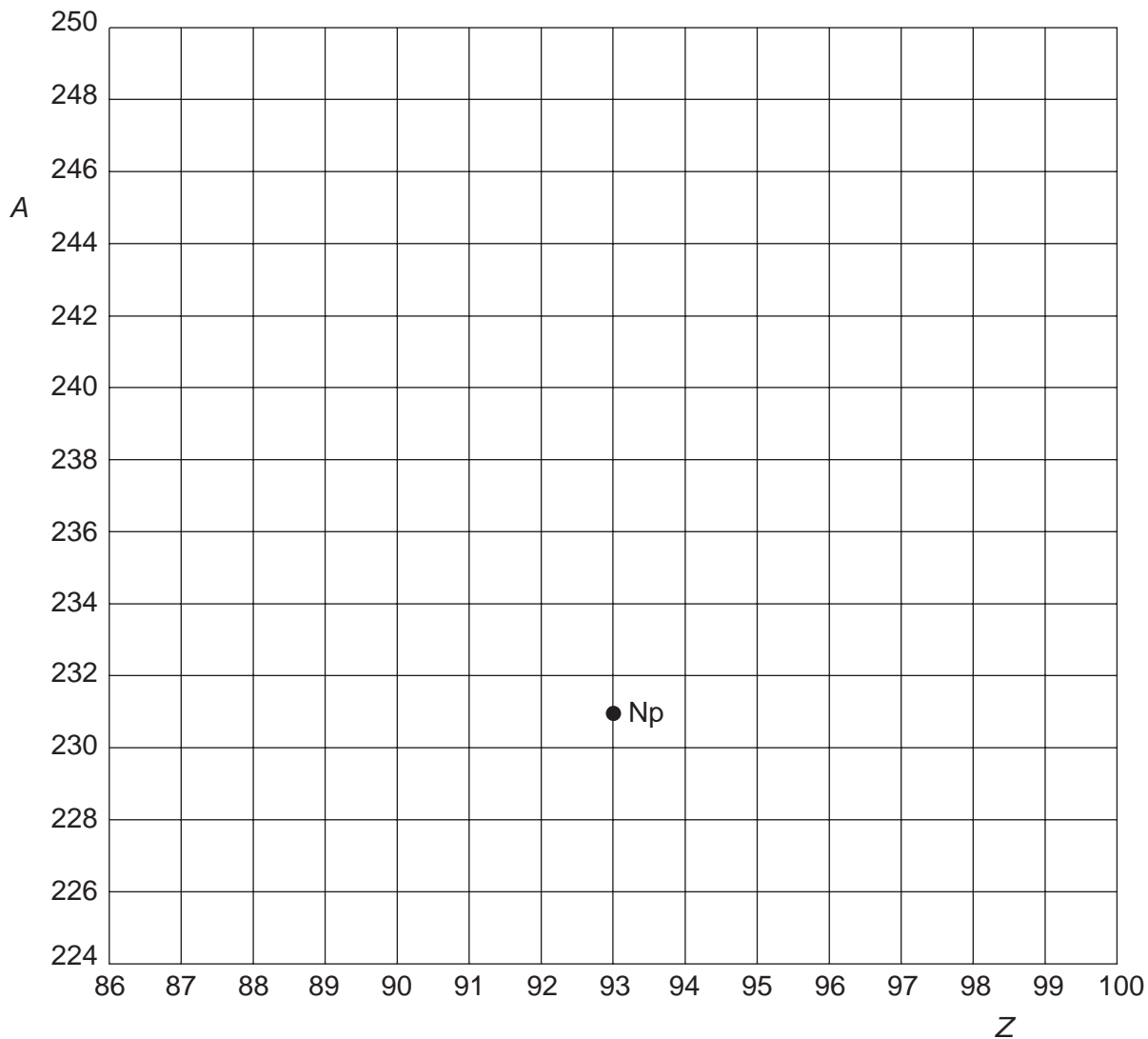


- 8 Fig. 8.1 shows the position of Neptunium-231 ( $^{231}_{93}\text{Np}$ ) on a diagram in which nucleon number (mass number)  $A$  is plotted against proton number (atomic number)  $Z$ .



**Fig. 8.1**

- (a) Neptunium-231 decays by the emission of an  $\alpha$ -particle to form protactinium.  
On Fig. 8.1, mark with the symbol Pa the position of the isotope of protactinium produced in this decay. [1]
- (b) Plutonium-243 ( $^{243}_{94}\text{Pu}$ ) decays by the emission of a  $\beta$ -particle (an electron).  
On Fig. 8.1, show this decay by labelling the position of Plutonium-243 as Pu and the position of the daughter product as D. [2]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.