

9 Fig. 9.1 represents all the particles in a neutral atom of a radioactive isotope X1.

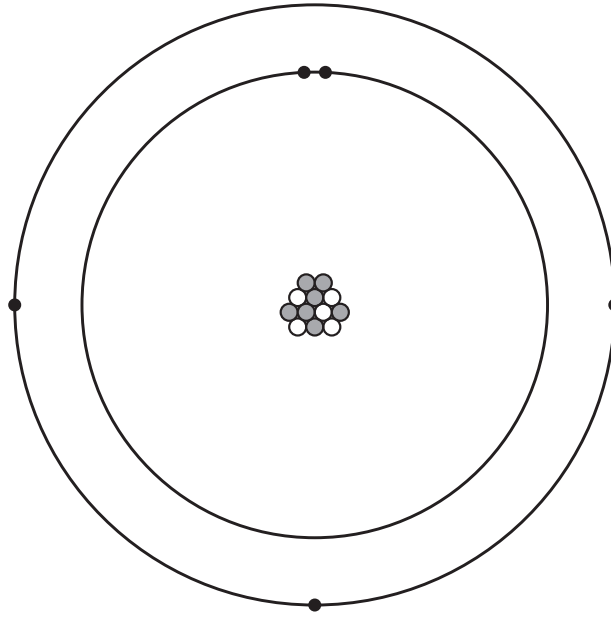


Fig. 9.1 (not to scale)

(a) Determine the number of neutrons in this atom and explain how the answer is obtained.

number of neutrons =

explanation

.....
.....

[2]

(b) The isotope X1 is a beta emitter that decays to the stable isotope X2.

(i) Describe how a nucleus of X2 differs from a nucleus of X1.

.....
..... [2]

(ii) Suggest why isotope X2 is stable whereas X1 is **not** stable.

.....
..... [1]

(c) The half-life of X1 is approximately 20 ms.

(i) Define the term half-life.

.....
.....
..... [2]

(ii) Suggest **one** reason why isotopes with very short half-lives are especially hazardous.

.....
..... [1]

[Total: 8]