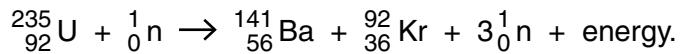


- 8 One possible nuclear fission reaction is



Barium-141 (${}^{141}_{56}\text{Ba}$) and krypton-92 (${}^{92}_{36}\text{Kr}$) are both β -emitters.

Barium-141 has a half-life of 18 minutes and a decay constant of $6.4 \times 10^{-4}\text{s}^{-1}$.

The half-life of krypton-92 is 3.0 seconds.

- (a) State what is meant by *decay constant*.

.....
.....
.....

[2]

- (b) A mass of 1.2 g of uranium-235 undergoes this nuclear reaction in a very short time (a few nanoseconds).

- (i) Calculate the number of barium-141 nuclei that are present immediately after the reaction has been completed.

number = [2]

- (ii) Using your answer in (b)(i), calculate the total activity of the barium-141 and the krypton-92 a time of 1.0 hours after the fission reaction has taken place.

activity = Bq [4]