

9 (a) Define activity of a radioactive sample.

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..... [1]

(b) Explain why the variation with time of the activity of a radioactive sample is exponential in nature.

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..... [3]

(c) A sample contains a single radioactive isotope that decays to form a stable isotope.

The sample has an activity of 180 Bq at time $t = 0$.

At a time 8.4 minutes later, the activity is 120 Bq.

(i) Determine the decay constant, in min^{-1} , of the radioactive isotope.

decay constant = min^{-1} [2]

(ii) Use your answer in (c)(i) to determine the half-life, in min, of the radioactive isotope.

half-life = min [1]