8 **(a)** State what is meant by the *decay constant* of a radioactive isotope.

For Examiner's Use

.....

.....

..... [2]

(b) Show that the decay constant λ is related to the half-life $t_{\frac{1}{2}}$ by the expression

$$\lambda t_{\frac{1}{2}} = 0.693.$$

[3]

(c) Cobalt-60 is a radioactive isotope with a half-life of 5.26 years (1.66×10^8 s).

A cobalt-60 source for use in a school laboratory has an activity of 1.8×10^5 Bq.

Calculate the mass of cobalt-60 in the source.

mass = ... g [3]

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Please turn over for Section B.