Question:

The half-life of carbon-14 is 5730 years. How much of a 50 g sample of carbon-14 is present after 11,460 years?

[49205]

$T_{1/2} = 5730$ year

$m_0 = 50$ g

$t = 11460$

$m - ?$

$N = N_0 e^{-\lambda t}$

$\lambda - ?$

$T_{1/2} = \dfrac{\ell n 2}{\lambda};$

$\lambda = \dfrac{\ell n 2}{T_{1/2}} = 12,1 \cdot 10^{-5} \dfrac{1}{year}$

$m = m_0 e^{-\lambda t}$

$m = 50 \cdot e^{-11460 \cdot 12,1 \cdot 10^{-5}} = 50 \cdot 0,25 = 12,5$ g

conclusion: $m = 12,5$ g