1) a $A = R(1 - e^{-\lambda t})$ $\lambda = \frac{\ln 2}{T_{1/2}} = \frac{\ln 2}{122.24\,s}$ $T_{1/2}$ from Nucleus program

$$A = 2.51 \times 10^7 /s \left(1 - e^{-\frac{\ln 2}{122.24} \times 5.00 \times 60}\right)$$

$$A = 2.51 \times 10^7 /s \left(1 - e^{-1.70}\right) = 2.51 \times 10^7 /s \,(0.818)$$

$$A = 2.05 \times 10^7 /s$$

b Fractional gain $= \dfrac{A(t=6) - A(t=5)}{A(t=5)} = \dfrac{2.51\times10^7\left(1-e^{-2.6}\right) - 2.05\times10^7}{2.05\times10^7}$

$$= \frac{2.51\times10^7\left[(0.870) - (0.818)\right]}{2.51\times10^7\,(0.818)}$$

Fractional gain $= 6.4 \times 10^{-2}$ or 6.4%

2) $A(now) = 0.022$ Bq/gC, $A(equil) = 0.226$ Bq/gC

$$\frac{A(t)}{A(eq)} = e^{-\frac{\ln 2 \cdot t}{5730\,yr}} \rightsquigarrow \ln\left(\frac{A(t)}{A(eq)}\right) = -\frac{\ln 2\, t}{5730\,yr}$$

$$\frac{5730\,yr}{\ln 2}\left(\ln\frac{A_{eq}}{A(t)}\right) = t$$

$$\frac{5730}{\ln 2}\,yr\,\ln\left(\frac{0.226}{0.022}\right) = t$$

$$19{,}257\,yr = t$$

3) $A = \lambda N \Rightarrow \left(\frac{\ln 2}{5730\ y}\right) 1.2\times10^{10}$

$$A = \frac{\ln 2 \times 1.2\times10^{10}}{5730 \times 365.25 \times 24 \times 3600} = 4.60\times10^{-2}\ /s$$

y d/y ln d = ln

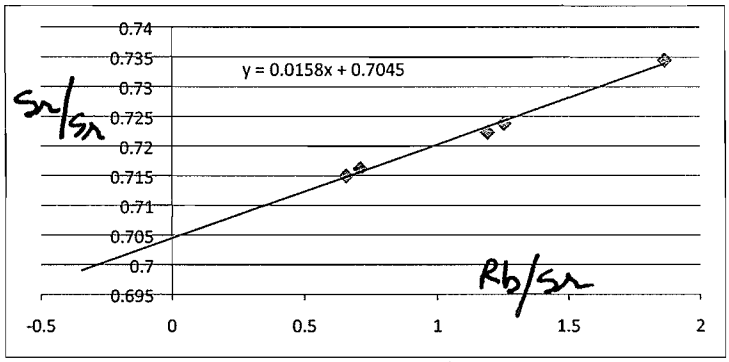
$$t = \frac{5730\ yr}{\ln 2} \ln\left(\frac{0.226\ /s}{4.6\times10^{-2}\ /s}\right) = 1.3\times10^{4}\ yr$$

4) a

Sample	87Rb/86Sr	87Sr/86Sr
217	1.255	0.7238
219	1.867	0.7345
220	1.192	0.7223
221	0.656	0.715
222	0.709	0.7162

slope = 0.0158

intercept = 0.7045



Data from J of Geology 76 (1968) 488 on Mount Bohemia, Michigan

from text book

slope = $(e^{+\lambda t} - 1)$ & $\lambda = 1.39\times10^{-11}/yr$

$0.0158 = (e^{\lambda t} - 1)$

$\ln(1.0158) = \lambda t \rightarrow t = \frac{\ln(1.0158)}{1.39\times10^{-11}/yr} = 1.13\times10^{9}\ yr$