relaxation time find ? $A = A_0 e^{-bt}$

$T = 1/b$ → constant

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① $T = 1/2$ s $\quad A = A_0 e^{-b \cdot t}$

$A = 5^0 \quad 4 = 5\, e^{-b \times (2 \times 2)}$

$4/5 = e^{-4b}$

$\ln(5/4) = e^{-4b}$

$0.0056 = b$

$T = \frac{1}{0.0056}$

$T = 178.57$

② $Q = 4000$

$\omega_d = 300$ Hz

$A = A_0/2$

$t = ?$

$A = A_0 e^{-bt}$

$A_0/2 = A_0 e^{-bt}$

$1/2 = e^{-bt}$

$2 = 1/bt$ $\qquad b = \frac{\omega_d}{2Q} = \frac{300}{2 \times 4000}$

$\frac{0.693}{b} = t$ $\qquad b = 0.2355$

$t = 2.94$ sec

③ $m = 0.2$ kg

$m_t = 0.2 + 0.8 = 1$ kg

(ii)

$A = A_0 e^{-bt}$

$1 = 2\, e^{-b30}$

$C_S = \frac{\beta m(\omega)}{b \cdot 2\pi}$ $\qquad b = \frac{n}{2m}$

$C_S = \frac{1 \times 2\pi \cdot 4}{0.0231 \times 2 \times 1}$

$C_S = 543.72$

(i) $\omega = \sqrt{\frac{K}{m}}$ $\qquad \omega = 2\pi f$

$\omega = 8\pi$

$\omega^2 = K/m$

$64\pi^2 = K$

$K = 631.65$

$T = \frac{2\pi}{b} = \frac{2}{}$

Relaxation time

(4) $f = 512$ Hz

$Q = 6 \times 10^4$

$E = E_0 e^{-2bt}$

$\frac{E_0}{e} = E_0 e^{-2bt}$

$e^{-1} = e^{-2bt}$

$1 = 2bt$

$t = \frac{1}{2b}$

$t = 18.65$ sec

$T = 1/f = \frac{1}{512}$

$\frac{1}{512}$ → 1 oscillation

18.65 → ?

18.65×512

$= 9553.92$

$Q = \frac{m\omega_d}{R}$

$Q = \frac{2\pi (512)}{2b}$

$b = \frac{1024\pi}{6 \times 10^4}$

$b = 268 \times 10^{-4}$

(5) $Q = \frac{\omega_d}{2b}$

$(\omega_0^2 - \omega_1^2) = 10^{-6} \omega_0^2$

$\omega_d^2 = \omega_0^2 - b^2$

$b^2 = \omega_0^2 - \omega_d^2$

$b^2 = 10^{-6} \omega_0^2$

$b = \omega_0 10^{-3}$

$Q = \frac{\omega_d}{2b}$

$Q = \frac{\sqrt{\omega_0^2 - b^2}}{2b}$

$= \frac{\sqrt{10^6 - 6^6}}{2}$

$g = \frac{v}{t} = \frac{\sqrt{10^6 - 1}}{24}$

$g = \frac{10^3}{2}$

$g = 500$

(5) $T = 2\pi\sqrt{\frac{l}{g}}$

$= 2\pi\sqrt{\frac{1}{\pi^2}}$

$T = 2\,sec$

(4) Value of 'g' is much smaller than on the earth.