①

$m = 1,10$

$k = 320\ N/m$

$b = 12,1\ kg/s$

$F_0 = 14,4\ N$

$f = 1,80\ Hz$

$\gamma = \frac{b}{2m}$

$\gamma = \frac{12,1}{2 \cdot 1,10}$

$\gamma = \frac{12,1}{2,2} = 5,50\ 1/s$

a-) $x_p(t) = A(\omega_f)\, sen(\omega_f t + \varphi)$

$\omega_f = 2\pi f$

$\underline{\omega_f = 11,3}$

$\omega_0 = \sqrt{\frac{k}{m}} = \sqrt{\frac{320}{1,1}}$

$\underline{\omega_0 = 17,1}$

$$A = \frac{14,4}{1,1\sqrt{(17,056)^2 - (11,3)^2)^2 + 4 \cdot 5,50^2 \cdot 11,3^2}}$$

$$A = \frac{13,09}{\sqrt{26639,83 + 15450,49}}$$

$$A = \frac{13,09}{205,16} = 0,0638\ m$$

$\underline{A = 0,0638\ m}$

$$\varphi = \text{Arctg}\left(\frac{2\beta w}{w_0^2 - w^2}\right)$$

$$= \text{Arctg}\left(\frac{2 \cdot 5{,}5 \cdot 11{,}3}{17{,}1^2 - 11{,}3^2}\right)$$

$$= \text{Arctg}\left(\frac{124{,}3}{164{,}72}\right) = \text{Arctg}(0{,}7546)$$

$$\varphi = 0{,}646$$

$$\boxed{X(t) = 0{,}0638 \cdot \text{sen}(11{,}3t + 0{,}646)}$$

b-) $w_R = \sqrt{w_0^2 - 2\beta^2}$

$w_R = \sqrt{(7{,}1)^2 - 2 \cdot (5{,}5)^2}$

$w_R = \sqrt{292{,}41 - 60{,}5} = \sqrt{231{,}91}$

$\boxed{w_R = 15{,}2 \text{ rad/s}}$

$$A = \frac{14{,}4}{1{,}1\sqrt{((7{,}1)^2 - 15{,}2^2)^2 + 4 \cdot (5{,}5)^2 \cdot (15{,}2)^2}} = \frac{13{,}09}{178{,}1}$$

$\boxed{A = 0{,}0735 \text{ m}}$

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