

Answers to questions

1. (a) $x = h / 2$ (b) $\lambda = \text{atan}(1/3)$
2. $P = 5.6 \text{ kN}$
3. (a) $V_A = 12.5 \text{ kN}$ $H_A = 24 \text{ kN}$ $V_C = 19.5 \text{ kN}$
4. (a) $\delta_B = \left(4 + 2\sqrt{2}\right) \frac{PL}{AE}$ (b) $\delta_C = 2\delta_B$
5. (a) $EI = 116.5 \text{ Nm}^2$ (b) $\delta = -0.01 \text{ m}$ (c) $V_A = 3.5 \text{ N}$ $x = 2/3$
 (d) $\theta(x) = C(1-x)$
6. (a) $P_{cr} = \frac{k_1 L}{2} + \frac{K}{2L}$ (b) $P_1 = \frac{k_2 L}{2}$ $P_2 = \frac{\pi^2 EI}{L^2}$ $k_{2,cr} = \frac{2\pi^2 EI}{L^3}$
 (c) $\frac{\pi^2 EI}{4L^2} < P_{cr} < \frac{\pi^2 EI}{L^2}$
9. (b) $\rho = 2699 \text{ kg/m}^2$
10. (a) $\sigma = \rho g y$ (b) $P_s(V) = \exp\left[-\left(\frac{\rho g}{\sigma_0}\right)^m \frac{AL^{m+1}}{V_0(m+1)}\right]$
11. (b) $F = Ed^2\left(\frac{\Delta d}{d} + \alpha\Delta T\right)$ (c) $\sigma = -\frac{E\alpha\Delta T}{(1-2\nu)} = 3.13 \text{ MPa}$
12. (a) $N_f = 3.50 \times 10^7 \text{ cycles}$