材料力学

[1]

(1) $R_A + R_B = P$

$F_A + F_B = 0$

$F_A a + P\ell = F_B a$

(2) $R_A = \frac{1}{2} P$, $F_A = -\frac{\ell}{2a} P$

$R_B = \frac{1}{2} P$, $F_B = \frac{\ell}{2a} P$

(3) $\tau_A = \frac{2P}{\pi d^2 a} \sqrt{a^2 + \ell^2}$

$\tau_B = \frac{2P}{\pi d^2 a} \sqrt{a^2 + \ell^2}$

(4) $\theta = \frac{2P\ell a}{Et\ell^3}$

[2] (1) $I = \frac{\pi d^4}{64}$

(2) $R_A = P + w\ell$, $M_A = -\ell\left(\frac{w\ell}{2} + \frac{2P}{3}\right)$

(3) $F_{AC} = P + w(\ell - x)$ $\left(0 \leqq x \leqq \frac{2}{3}\ell\right)$

$F_{BC} = w(\ell - x)$ $\left(\frac{2}{3}\ell \leqq x \leqq \ell\right)$

(4) $M_{AC} = -\frac{w}{2}(\ell - x)^2 - P\left(\frac{2}{3}\ell - x\right)$ $\left(0 \leqq x \leqq \frac{2}{3}\ell\right)$

$M_{CB} = -\frac{w}{2}(\ell - x)^2$ $\left(\frac{2}{3}\ell \leq x \leq \ell\right)$

(5) $\sigma_{max} = \frac{32\ell}{\pi d^3}\left(\frac{w}{2}\ell + \frac{2}{3}P\right)$