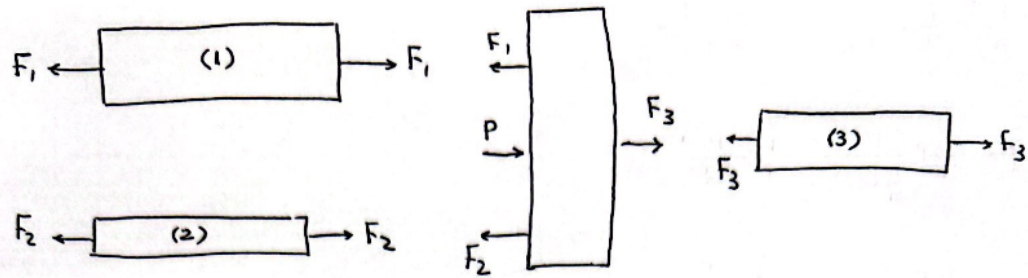


1)



Connector C $\Rightarrow \sum F_X = 0 \Rightarrow P - F_1 - F_2 + F_3 = 0$ Eq (1)

2) node 1 $\rightarrow e_1 = \frac{F_1 \times 2L}{E \frac{\pi}{4} (2d)^2}$

node 2 $\rightarrow e_2 = \frac{F_2 \times 2L}{E \frac{\pi}{4} (d)^2}$

node 3 $\rightarrow e_3 = \frac{F_3 \times L}{E \frac{\pi}{4} d^2}$

(3) $e_1 = e_2 \Rightarrow \frac{F_1 \times 2L}{E \frac{\pi}{4} (2d)^2} = \frac{F_2 \times 2L}{E \frac{\pi}{4} (d)^2} \Rightarrow F_1 = 4F_2$ Eq (2)

$e_1 = e_3 \Rightarrow \frac{F_1 \times 2L}{E \frac{\pi}{4} (2d)^2} = \frac{F_3 \times L}{E \frac{\pi}{4} d^2} \Rightarrow F_1 = 2F_3$ Eq (3)

(4) Eq (1), (2), (3) $\Rightarrow P - F_1 - \frac{F_1}{4} - \frac{F_1}{2} = 0 \Rightarrow F_1 = \frac{4}{7} P, F_2 = \frac{1}{7} P, F_3 = \frac{2}{7} P$

$$\sigma_1 = \frac{F_1}{A_1} = \frac{4}{7} P \frac{1}{\frac{\pi}{4} (2d)^2} = \frac{4}{7} \frac{P}{\pi d^2}$$

$$\sigma_2 = \frac{F_2}{A_2} = \frac{1}{7} P \frac{1}{\frac{\pi}{4} (d)^2} = \frac{4}{7} \frac{P}{\pi d^2}$$

$$\sigma_3 = \frac{F_3}{A_3} = -\frac{2}{7} P \frac{1}{\frac{\pi}{4} d^2} = -\frac{8}{7} \frac{P}{\pi d^2}$$

PART B

Structure 1

$$-e_1 = l\theta \quad , \quad e_2 = \frac{l}{2}\theta \quad \Rightarrow \quad e_1 = -2e_2$$

Structure 2

$$e_1 = l\theta \quad , \quad e_2 = \frac{l}{2}\theta \quad \Rightarrow \quad e_1 = 2e_2$$