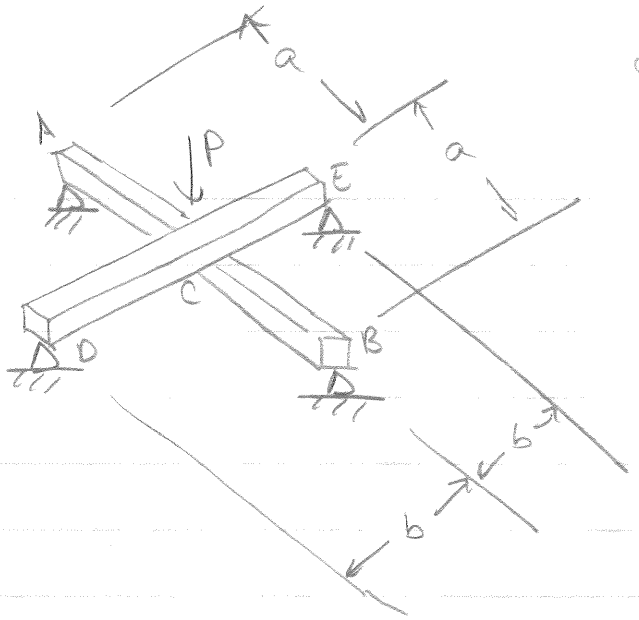
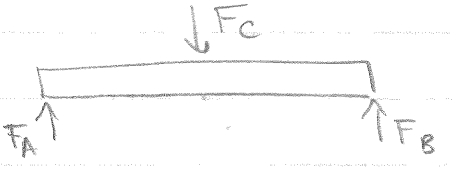
15.47)

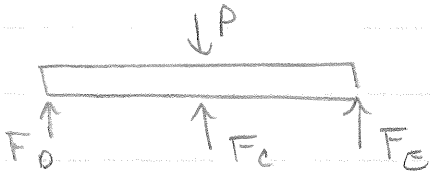



a = 4 ft
b = 5 ft
P = 6 kips

both beams have stiffness EI

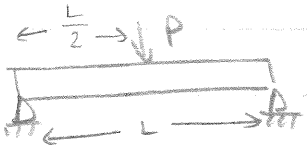
find reaction @ a) B b) E




⇒ deflection @ C same for both beams

from Appendix C, for a beam as shown below




$$u\left(\frac{L}{2}\right) = -\frac{PL^3}{48EI}$$

in beam AB, $\delta_{C,AB} = -\frac{F_C L_{AB}^3}{48EI}$

in beam DE, $\delta_{C,DE} = -\frac{L_{CD}^3}{48EI}(P - F_C)$

$$\delta_{C,AB} = \delta_{C,DE}, \quad -\frac{F_C L_{AB}^3}{48EI} = -\frac{(P-F_C) L_{CD}^3}{48EI}$$

$$F_C L_{AB}^3 = (P - F_C) L_{CD}^3,$$

$$F_{CD} = \frac{P L_{CD}^3}{L_{AB}^3 + L_{CD}^3} = \frac{(6 \cdot 10^3 \text{ lb})(10 \text{ ft})^3}{(8 \text{ ft})^3 + (10 \text{ ft})^3} = 3.968 \text{ kip}$$

a) $F_B = F_A$ , $\Sigma F_y = F_A + F_B - F_C = 0 \Rightarrow F_B = \frac{1}{2} F_C$

$\boxed{F_B = 1.984 \text{ kip}}$

b) $F_D = F_E$, $\Sigma F_y = F_C + F_D + F_E - P = 0 \Rightarrow F_E = \frac{1}{2}(P - F_C)$

$F_E = 1.015$ kips