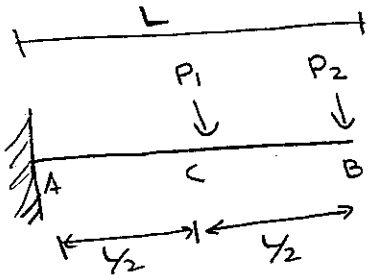

$L = 15m$

$P_1 = 2000kg$

$P_2 = 1000kg$

Bending moment & Partial derivatives for segment CB

$$m_{CB} = -P_2 x \qquad (0 \le x \le \tfrac{L}{2})$$

$$\frac{\partial m_{CB}}{\partial P_1} = 0 \qquad \frac{\partial m_{CB}}{\partial P_2} = -x$$

Bending moment & Partial Derivatives for segment AC

$$m_{AC} = -P_1\left(x - \tfrac{L}{2}\right) - P_2 x \qquad \left(\tfrac{L}{2} \le x \le L\right)$$

$$\frac{\partial m_{AC}}{\partial P_1} = \tfrac{L}{2} - x \qquad \frac{\partial m_{AC}}{\partial P_2} = -x$$

Deflection at C

$$\delta_C = \frac{1}{EI}\int_0^{\frac{L}{2}} (m_{CB})\left(\frac{\partial m_{CB}}{\partial P_1}\right)dx + \frac{1}{EI}\int_{\frac{L}{2}}^{L} (m_{AC})\left(\frac{\partial m_{AC}}{\partial P_1}\right)dx$$