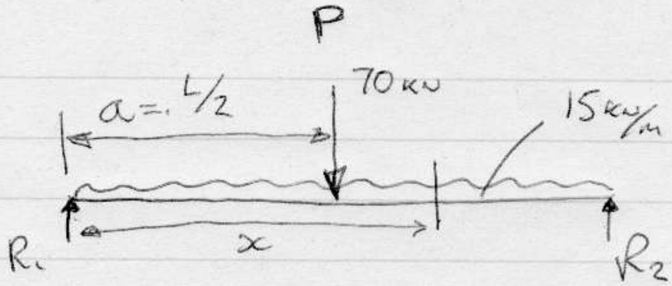


MACAULEY'S METHOD

$$EI\frac{d^2x}{dy^2} = R_1x - \frac{\omega x^2}{2} - P[x-a]$$

$$EI\frac{dx}{dy} = \frac{R_1x^2}{2} - \frac{\omega x^3}{6} - \frac{P[x-a]^2}{2} + A$$

$$EIy = \frac{R_1x^3}{6} - \frac{\omega x^4}{24} - \frac{P[x-a]^3}{6} + Ax + B$$

Now $y = 0 \therefore x = 0 \quad \therefore B = 0$

$$\frac{dy}{dx} = 0 \therefore x = a = \frac{L}{2}$$

$$\therefore A = \frac{\omega x^3}{6} - \frac{R_1x^2}{2} \quad \text{as} \quad \frac{P[x-a]^2}{2} = 0$$

$$A = \frac{15 \times 2{\cdot}5^3}{6} - \frac{72{\cdot}5 \times 2{\cdot}5^2}{2} = -187{\cdot}5$$

MAXIMUM DEFLECTION @ $a = \frac{L}{2}$

$$EIy = \frac{R_1\left(\frac{L}{2}\right)^3}{6} - \frac{\omega\left(\frac{L}{2}\right)^4}{24} - 0 + \left(-187.5 \times \frac{L}{2}\right) + 0$$

$$188.80 - 24.414 - 0 - 468.75$$

$EIy = -304.364 \times 10^3$ $\therefore$ ($\times 10^3$ BECAUSE LOAD WAS IN KN)

$$y = \frac{-304.364 \times 10^3}{EI}$$