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ID = 7962

Section = B

Assignment = 3.

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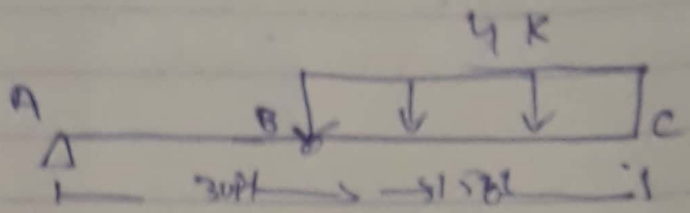
Q1



Slop (θc) = ?

Displacement (Δc) = ?

First we have to draw M/EI diagram

So

$\curvearrowleft +$ $\Sigma MA = 0$

$-VB \times 30 + (4 \times 15) \times 37.5 = 0$

$$\boxed{VB = 75\ k}$$

$\curvearrowleft +$ $\Sigma MB = 0$

$VA \times 30 + (4 \times 15) \times 7.5 = 0$

$$\boxed{VA = -15\ k}$$

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By proportionality of triangles

$$\frac{\Delta'}{45} = \frac{t_{B/A}}{30}$$

$$\boxed{\Delta' = 3/2\ t_{B/A}}$$

eq (1) →

$$D_1 = t_{C/A} = 3/2\ t_{B/A}$$

$$\Delta C = -\frac{194062.5}{2} \cdot \left(\frac{6.75}{EI}\right) \frac{3}{4}$$

$$\Delta C = \frac{2953125}{EI}\ k \cdot ft^3$$

Slope at point B

$$\theta B = \frac{DC}{15}$$

$$\left(\frac{2953125}{EI}\right)/16$$

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$$\phi_B = \frac{19687.8}{EI} \; k \cdot ft^2$$

for displacement

$$t_{C/A} = \Delta_C + \Delta'$$

$$\Delta_C = t_{C/A} - \Delta'$$

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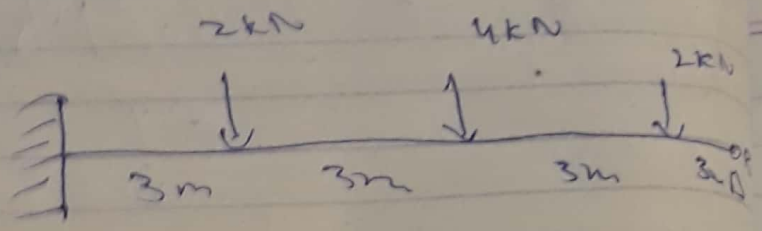
Q)



$E = 200\ GPa$

$I = 6(10^6)\ mm^4$

$$\theta_{BA} = \frac{1}{2}\left(\frac{12}{EI} \times 3\right) + \left(\frac{12}{EI} \times 3\right) +$$

$$\frac{1}{2}\left(\frac{6}{EI} \times 3\right)$$

$$= \frac{18}{EI} + \frac{36}{EI} + \frac{9}{EI}$$

$$\frac{63}{EI} = \frac{63}{(200 \times 10^6)(6 \times 10^{-6})(1/1000)^4}$$

$\theta_{BA} = 0.0525$ radian.

$$t_{A/C} = \frac{1}{2}\left(\frac{12}{EI} \times 3\right)\left(\frac{2}{3} \times 3\right) + \left(\frac{12}{EI} \times 3\right)$$

$$3 + \frac{1}{2} \times 3) + \frac{1}{2}\left(\frac{6}{EI} \times 3\right)\left(3 + \frac{2}{3}\right)$$

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$tan\,c = 0.202m$

$\Delta c \; tan\,c = 0.202m$

$\Delta c = 202mm$

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