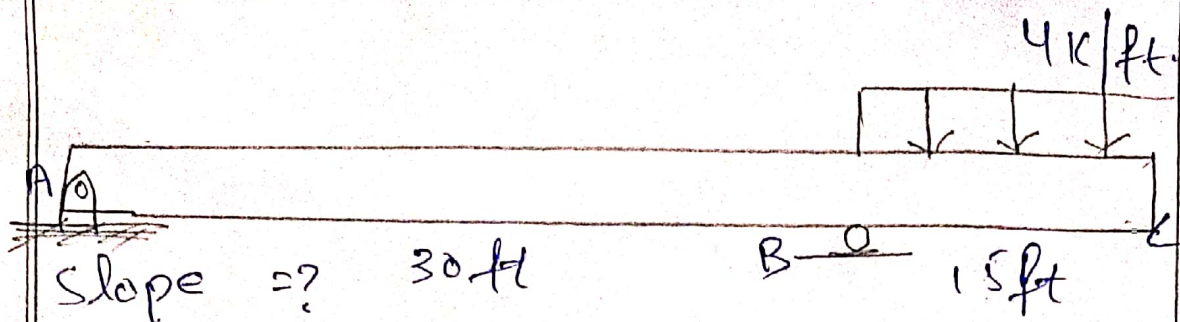


Question: 01

Assig: 03



Slope = ? 30 ft

B — 15 ft

Displacement (ΔC) = ?First we have to draw M/EI diagram

so,

$$\uparrow \sum M_A = 0$$

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

$$V_B = 75 \text{ k}$$

$$+\downarrow \sum M_B = 0$$

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

$$\Rightarrow V_A = -15 \text{ k}$$

$$\Delta C = \frac{-194062.5}{2} - \left(\frac{67500}{EI} \right) \times \frac{3}{2}$$

$$\Delta C = \frac{295312.5}{EI} \text{ k}^2 \text{ ft}^3$$

Slope at point B:-

$$\theta_B = \frac{\Delta C}{15}$$

$$= \left(\frac{295312.5}{EI} \right) / 15$$

$$Q_B = \frac{19687.5}{EI} \text{ k ft}^2$$

For displacement:

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

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

By proportionality of times

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

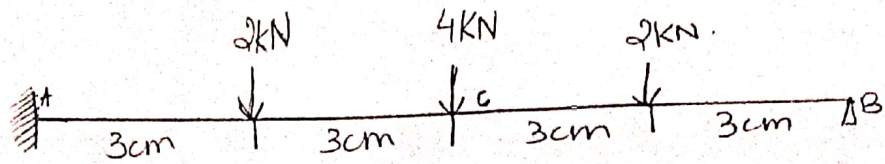
$$D' = 3/2 t_{B/A}$$

eq (1) \Rightarrow

$$\Delta_C = t_{C/A} = 3/2 t_{B/A} \quad \text{--- (11)}$$

QUESTION: 02

Assignment #03



$$E = 200 \text{ GPa.}$$

$$I = 6 (10^6) \text{ mm}^4$$

$$\Delta_{AK} = \frac{1}{2} \left(\frac{12}{EI} \times 3 \right) + \left(\frac{12}{EI} \times 3 \right) + \frac{1}{2} \left(\frac{6}{EI} \times 3 \right)$$

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

$$= \frac{63}{EI} = \frac{63}{(200 \times 10^9) (6 \times 10^6) (1/1000)^4}$$

$$\theta_A = 0.6525 \text{ radian.}$$

$$t_{A/C} = \frac{1}{2} \left(\frac{12}{EI} \times 3 \right) \left(\frac{2}{3} \times 3 \right) + \left(\frac{12}{EI} \times 3 \right) \left(\frac{37.1}{2} \times 3 \right) +$$

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

$$t_{A/C} = 0.202 \text{ m.}$$

$$\Delta_C = t_{A/C} = 0.202 \text{ m.}$$

or

$$\Delta_C = 202 \text{ mm.}$$