

Assignment = 3

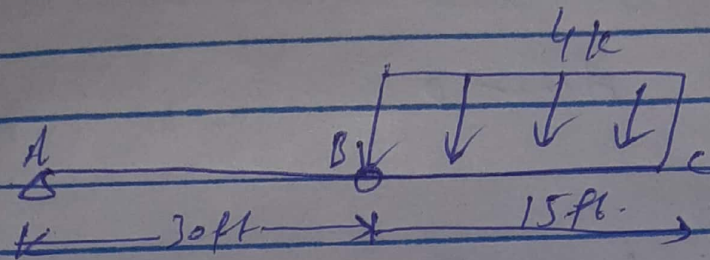
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Section = B.

Subject = S.A.

Q 1 :-



$$\text{Slop } (\theta_c) = ?$$

$$\text{Displacement } (\Delta_c) = ?$$

first we have to draw
M/EI diagram

So,

$$\uparrow \sum M_A = 0$$

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

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

$$\uparrow \sum M_B = 0$$

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

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

$$\Delta_c = -\frac{194082.5}{2} - \left(\frac{67500}{EI}\right) \times \frac{3}{2}$$

$$\Delta_c = -\frac{295312.5}{EI} \text{ k-ft}^3$$

Slope at point B:

$$\theta_B = \frac{\Delta_c}{15}$$

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

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

For displacement:

$$t_c/A = \Delta_c + \Delta'$$

$$\Delta_c = t_c/A - \Delta'$$

By proportionality of
sides.

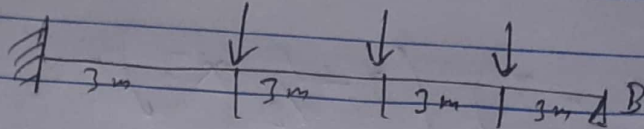
$$\frac{D'}{45} = \frac{t_{B/A}}{30}$$

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

eg ① \Rightarrow

$$D' = t_{A/B} - \frac{3}{2} t_{B/A} \rightarrow \text{②}$$

$$Q = 2 \text{ J.}$$



$$E = 200 \text{ Gpa}$$

$$I = 6(10^8) \text{ mm}^4.$$

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

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

$$= \frac{63}{EI}$$

$$= \frac{63}{(200 \times 10^9) (6 \times 10^8) \left(\frac{1}{1000} \right)^4}$$

$$Q_A = 0.0525 \text{ radian}$$

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

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

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

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

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

0.2

$$\Delta C = 202 \text{ mm}$$