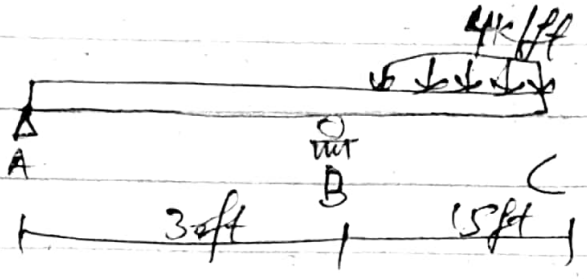
Q No 1



using the $\frac{M}{EI}$ diagram and elastic curve shown

$$\theta_C = |\theta_{C/A}| = \frac{1}{2}\left(\frac{4\times 45}{EI}\right)(45) + \left(\frac{2(4)(45)}{EI}\right)(45) + \frac{1}{2}\left(\frac{4\times 45}{EI}\right)(45) = \frac{1}{EI}(4050 + 16200 + 4050)$$

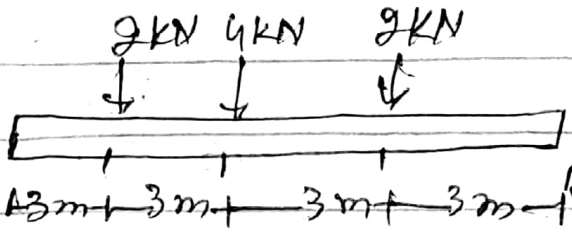
$$\theta_C \frac{74300}{EI} \text{ rad.}$$

$$\Delta_C = |t_{C/A}| = \left[\frac{1}{2}\left(\frac{4\times 45}{EI}\right)(45)\right]\left[45 + \frac{2}{3}(45)\right] + \left[\frac{2(4)(45)}{EI}(45)\right]\left[\frac{45}{2}\right] + \left[\frac{1}{2}\left(\frac{4\times 45}{EI}\right)(45)\right]\left[\frac{2}{3}(45)\right] = 0$$

$$= \left[\frac{8100}{EI}\right](75) + \left(\frac{16200}{EI}\right)(67.5) + \left(\frac{8100}{2EI}\right)(30)$$

$$\Delta_C = \frac{1944000}{6EI} \text{ Ans}$$

Q.No2



Solution:-

$$\theta A/C = \frac{1}{2}\left(\frac{12}{EI}\right)3\left(\frac{2}{3}\right)3 + \frac{1}{2}\left(\frac{6}{EI}\right)(3)$$

$$\theta A/C = \frac{18}{EI} + \frac{36}{EI} + \frac{9}{EI}$$

$$\theta A/C = \frac{63}{EI}$$ Putting the value

$$\theta A/C = \frac{63}{(200\times10^6)(6\times10^{-6})(1000)^{-4}} = \frac{63}{1200}$$

$$\theta A/C = 0.0525 \text{ radias}$$

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$$t A/C = \left[\frac{1}{2}\left(\frac{12}{EI}\right)(3)\right]\left[\frac{2}{3}(3)\right] + \left[\frac{12}{EI}(3)\right]\left[3+\frac{1}{2}(3)\right]$$

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

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

$\Delta L = t\Delta L = 0.202 \text{ mm}$

$\boxed{\Delta L = 0.202 \text{ mm Ans}}$