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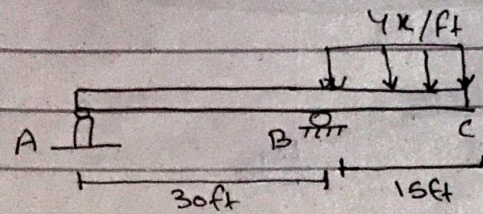
Semester :- 12th

Subject :- Structure Analysis I

Assignment :- 3

Submitted to :- Engr Amjad Islam

Q no 1



Using the $\frac{M}{EI}$ diagram and Elastic Curve shown

$$\theta_c = \left| \theta_c/A \right| = \frac{1}{2} \left(\frac{4 \times 45}{EI} \right) (45) + \left(\frac{2(4)(45)}{EI} \right) (45) + \frac{1}{2} \left(\frac{4 \times 45}{EI} \right) (45) = \frac{1}{EI} (4250 + 16200 + 4050)$$

$$\theta_c = \underline{24300} \text{ rad}$$

$$\Delta_c = \left| \delta_c/A \right| = \left[\frac{1}{2} \left(\frac{4 \times 45}{EI} \right) (45) \right] \left[45 + \frac{2}{3} (45) \right] +$$

$$\left[\frac{2(4)(45)}{EI} (45) \right] \left(45 + \frac{45}{2} \right) + \left[\frac{1}{2} \left(\frac{4 \times 45}{EI} \right) (45) \right] \left(\frac{2}{3} (45) \right) = 0$$

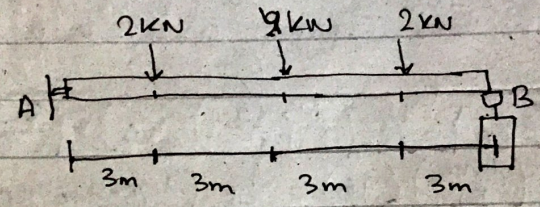
$$= \left[\frac{8100}{EI} \right] [75] + \left(\frac{16200}{EI} \right) (67.5) + \left(\frac{8100}{2EI} \right) (30)$$

2

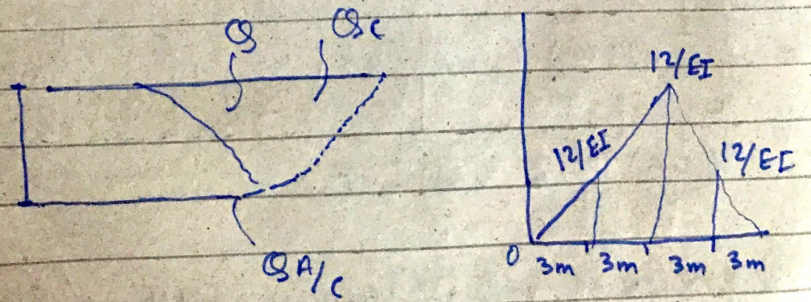
$$\Delta_c = \frac{6076000 + 1093500 + 243000}{6EI}$$

$$\Delta_c = \frac{1974000}{6EI} \quad \underline{\text{Ans}}$$

Qno 2:-



Determine the slope at A and displacement at C of the beam in the figure by a) - Moment-Area Theorem and Take $E = 200 \text{ GPa}$, $I = 6 (10^8) \text{ mm}^4$



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

$$\theta_{A/c} = \frac{18}{EI} + \frac{36}{EI} + \frac{9}{EI}$$

$$\theta_{A/c} = \frac{63}{EI} \quad \text{Putting the Values}$$

$$\theta_{A/c} = \frac{63}{(200 \times 10^6) (6 \times 10^8) (1000)^{-4}} = \frac{63}{12000}$$

$$\theta_{A/c} = 0.0525 \text{ radians}$$

$$\theta_A = 0.525 \text{ rad Ans}$$

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

$$\left(3 + \frac{1}{2} (3) \right) + \left[\frac{1}{2} \left(\frac{6}{EI} \right) (3) \right] \left(\frac{3+2}{3} (3) \right) = 0.202 \text{ m}$$

$$\Delta_c = \delta_{A/c} = 0.202 \text{ m}$$

$$\Delta_c = 202 \text{ mm} \quad \underline{\text{Ans}}$$