

NAME:

FARAN-Ali KHAN.

ID:

73915.

SUBJECT:

STRUCTURAL ANALYSIS I

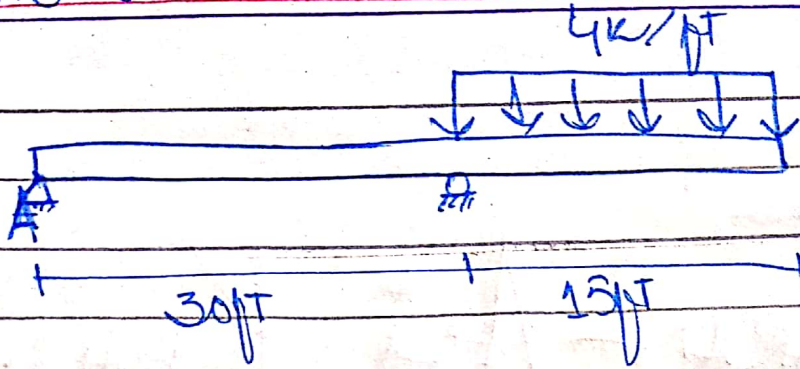
INSTRUCTOR:

Sir Anjad - ISEANP

DATE:

13<sup>th</sup> July - 2020.

Question No 1:



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

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

$$+ \frac{1}{2} \left( \frac{4 \times 45}{EI} \right) (45) = \frac{1}{EI} (4050 + 16200 + 4050)$$

$$\theta_c = \frac{24300}{EI} \text{ rad.}$$

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

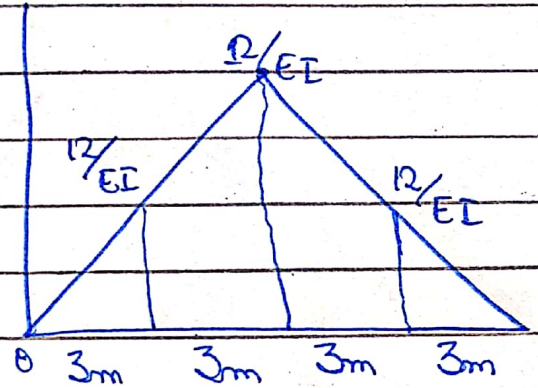
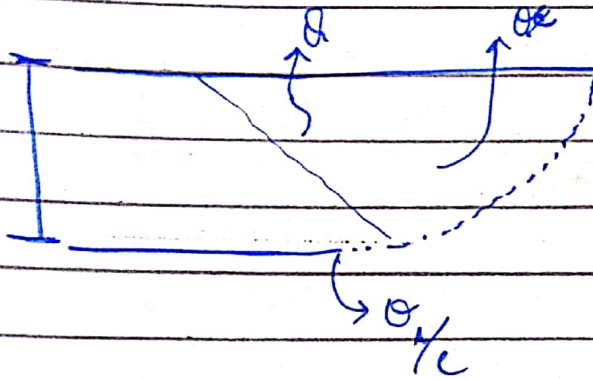
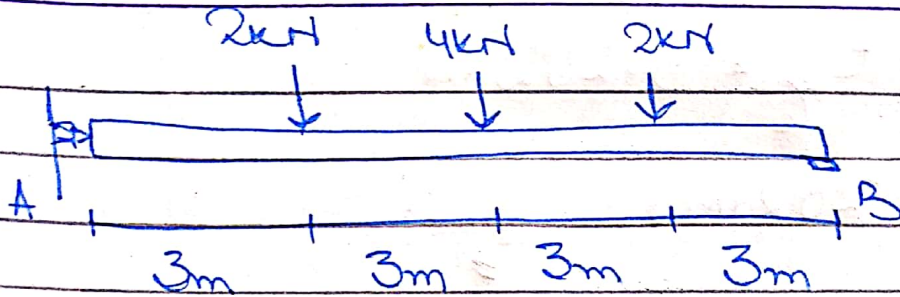
$$\left( 45 + \frac{45}{2} \right) + \left[ \frac{1}{2} \left( \frac{4 \times 45}{EI} \right) (45) \right] \left( \frac{2}{3} (45) \right) = 0$$

$$= \left[ \frac{8100}{EI} \right] [25] + \left( \frac{16200}{EI} \right) (67.5) + \left( \frac{8100}{2EI} \right) (30).$$

$$\Delta_c = \frac{607500 + 1093500 + 243000}{6EI}$$

$$\Delta_c = \frac{1944000}{6EI}$$

# Question No 2:



$$\theta_{A/c} = \frac{1}{2} \left( \frac{12}{EI} \right) 3 \left( \frac{0}{EI} \right) 3 + \frac{1}{2} \left( \frac{6}{EI} \right) (3) \cdot$$

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

$$\theta_{A/c} = \frac{63}{EI}$$

Putting the values

$$\theta_{A/c} = \frac{63}{(200 \times 10^6)(6 \times 10^6)(1000)^4} = \frac{63}{1200}$$

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

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

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

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

$$\Delta_c = t_{\Delta_c} = 0.202 \text{ m}$$

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