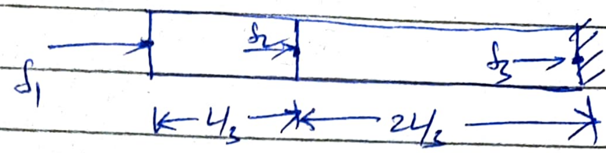
(3.)



$$u = \begin{bmatrix} 3.5 \\ 8.5 \\ 0 \end{bmatrix} \text{ mm}$$

$A = 600 \text{ mm}^2$

$E = Y = 70 \text{ GPa}$

$L = 600 \text{ mm}$

$$K_{e_1} \Rightarrow \frac{AE}{(L/3)} \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

$$K_{e_2} = \frac{AE}{(2L/3)} \Rightarrow \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

$$K_G \Rightarrow \frac{3AE}{2L} \begin{bmatrix} 2 & -2 & 0 \\ -2 & 3 & -1 \\ 0 & -1 & 1 \end{bmatrix}$$

$$F \Rightarrow \begin{bmatrix} f_1 \\ f_2 \\ f_3 \end{bmatrix}$$

$\therefore K_G u = F$; ~~After applying B/c $u_3 = 0$~~

$$\frac{3AE}{2L} \begin{bmatrix} 2 & -2 & 0 \\ -2 & 3 & -1 \\ 0 & -1 & 1 \end{bmatrix} \begin{bmatrix} 3.5 \\ 8.5 \\ 0 \end{bmatrix} = \begin{bmatrix} f_1 \\ f_2 \\ f_3 \end{bmatrix}$$

$$\therefore f_1 \Rightarrow \frac{3AE}{2L} \times (7-5) \Rightarrow \frac{3AE}{L} \Rightarrow 210 \times 10^9 \times 10^{-3} \Rightarrow \underline{210 \text{ MN}}$$

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$$f_2 \Rightarrow \frac{3AE}{2L} \times (-7 + 7.5)$$

$$\Rightarrow \frac{1}{4}\left(\frac{3AE}{L}\right) \Rightarrow \underline{52.5\ MN}$$

$$f_3 \Rightarrow \frac{3AE}{2L} \times (-2.5) \Rightarrow \underline{-265.5\ MN}$$