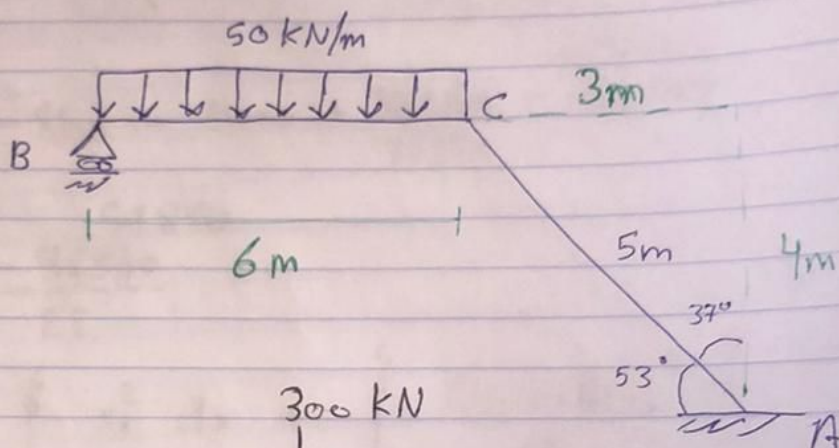


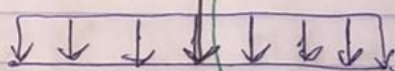
Quiz 7

Mohammad Al-Swaity

1181136



Real :-

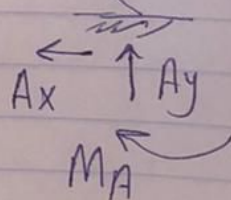


$$\sum F_y = 0 : A_y = 300 \text{ kN} \uparrow \textcircled{1}$$

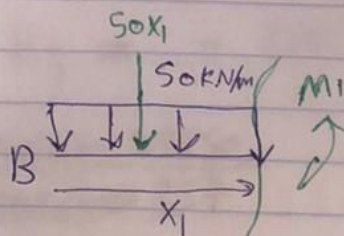
$$\sum F_x = 0 : A_x = 0$$

$$\sum M_A = 0 : 6(300) = M_A$$

$$M_A = 1800 \text{ kN}\cdot\text{m}$$

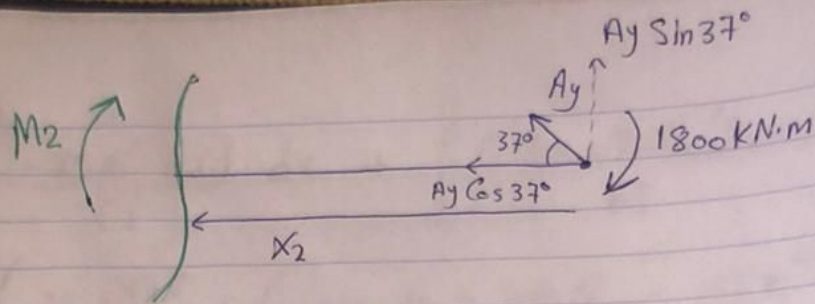


section ① :



$$M_1 = -50 x_1 \cdot \frac{x_1}{2}$$

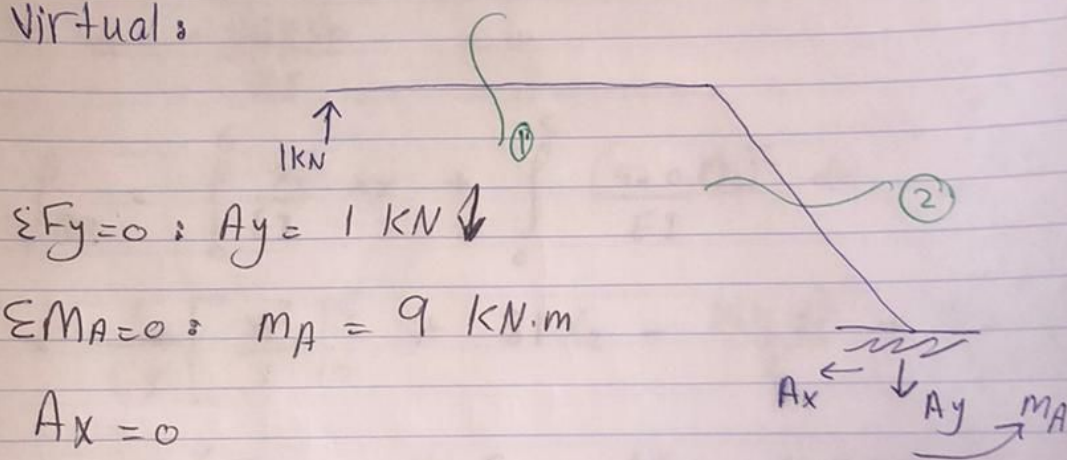
$$M_1 = -25 x_1^2 \quad (0 < x_1 < 6)$$



$$M_2 = -1800 + (A_y \sin 37^\circ)(x_2)$$

$$M_2 = -1800 + 180 x_2 \quad (0 < x_2 < 5)$$

Virtual:

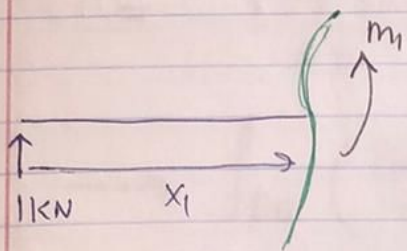


$$\sum F_y = 0 : A_y = 1 \text{ kN} \downarrow$$

$$\sum M_A = 0 : m_A = 9 \text{ kN.m}$$

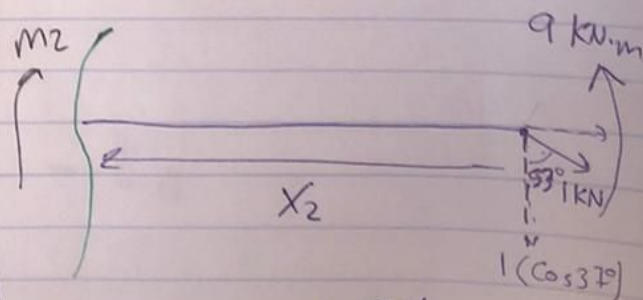
$$A_x = 0$$

Section ①:



$$m_1 = x_1 \quad (0 < x_1 < 6)$$

Section ②:



$$m_2 = 9 - 0.8 x_2$$

$$(0 < x_2 < 5)$$

$$\Delta_B = \int_0^6 \frac{-25x_1^2 (x_1)}{EI} dx + \int_0^5 \frac{(-1800 + 180x_2)(9 - 0.8x_2)}{EI} dx$$

$$= \frac{1}{EI} \left(\left. -\frac{25}{4} x_1^4 \right|_0^6 + \left(-16200x_2 + \frac{3060}{2} x_2^2 - \frac{144}{3} x_2^3 \right) \Big|_0^5 \right)$$

$$= \frac{1}{EI} (-8100 - 81000 + 38250 - 6000)$$

$$= \frac{-56850}{EI}$$

$$f_{BB} = \int_0^6 \frac{x_1^2}{EI} dx + \int_0^5 \frac{(9 - 0.8x_2)^2}{EI} dx$$

$$= \frac{1}{EI} \left[\left. \frac{x_1^3}{3} \right|_0^6 + 81x_2 - \frac{14.4}{2} x_2^2 + \frac{0.64}{3} x_2^3 \right]_0^5$$

$$= \frac{1}{EI} (72 + 405 - 150 + 26.667)$$

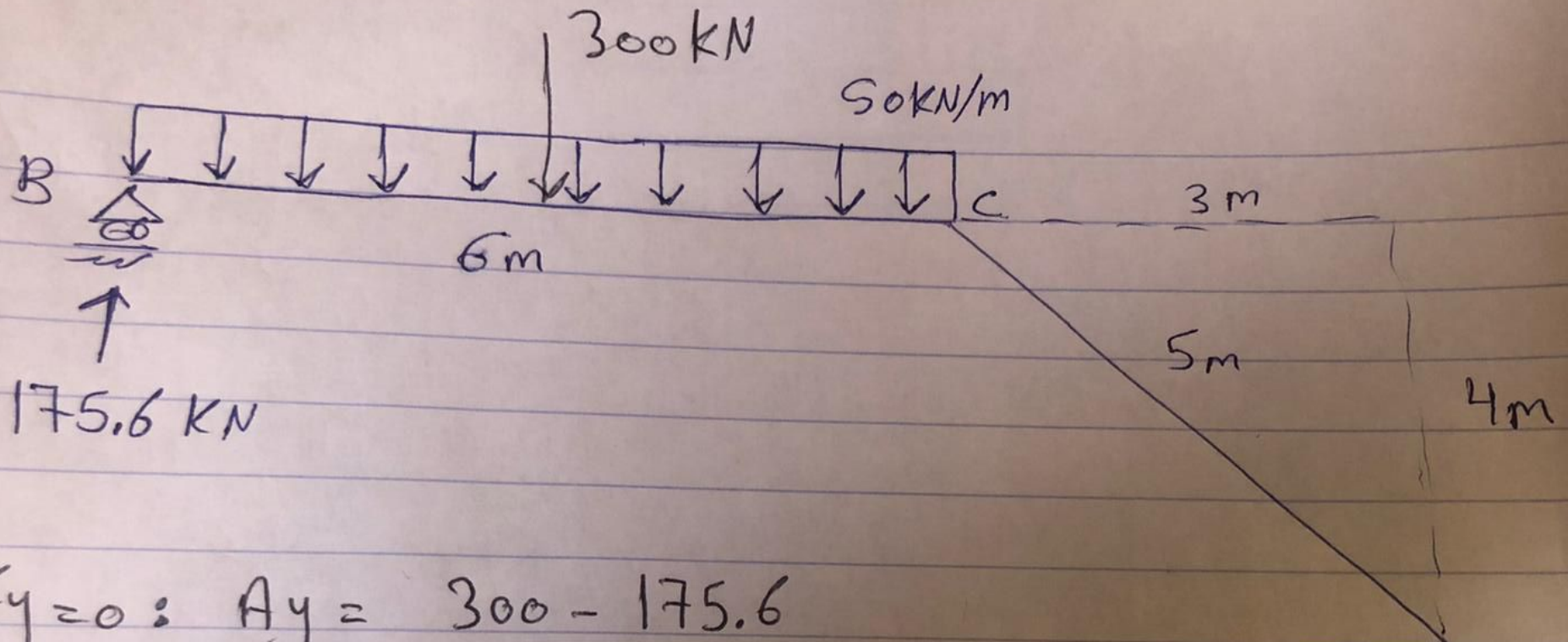
$$= \frac{323.667}{EI}$$

$$\rightarrow f_{BB} (B_y) = -\Delta_B$$

$$B_y = \frac{56850}{323.667}$$

$$\rightarrow B_y = 175.6 \text{ kN}$$

↑



$$\begin{aligned} \sum F_y = 0 : A_y &= 300 - 175.6 \\ &= 124.4 \text{ kN} \end{aligned}$$

$$\sum M_A = 0 : -M_A + 1800 - (175.6)(9) = 0$$

$$M_A = 219.6 \text{ kN}\cdot\text{m}$$

