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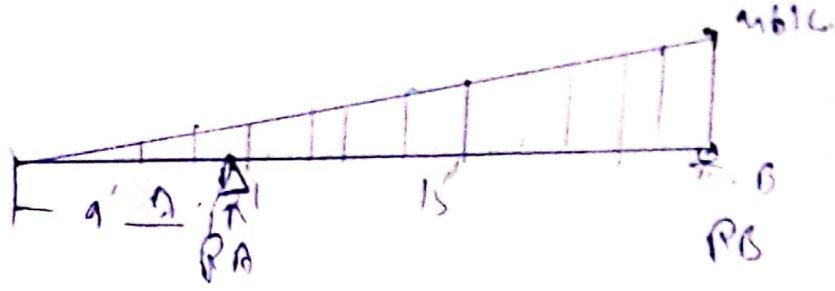
Section # B.

Submitted To # Engr Sarib Khan.

Subject # Structure (I)

Date # 26-9-20.

Q 1



$\sum M_B = 0$ (Clockwise)

$$\frac{1}{8} \times 46 \times 24 \times \frac{1}{3} \times 24 = R_A \times 15$$

$$R_A = 294.4 \text{ lb}$$

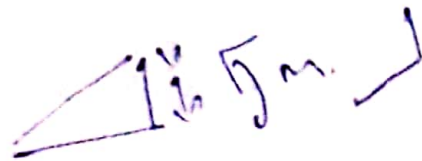
$\sum F_y = 0 \uparrow$

$$R_A + R_B = \frac{1}{8} \times 46 \times 24$$

$$R_B = 552 - 294.4$$

$$R_B = 257.6 \text{ lb}$$

Now section (1)-(1)



for y .

$$\frac{y}{x} = \frac{16}{24} \Rightarrow y = \left(\frac{16}{24}\right)x$$

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So $\Sigma R_i = 0 \uparrow +$.

$$\Rightarrow -\frac{1}{8} \times x \times \left(\frac{46}{24} \right) x - VC = 0.$$

$$\Rightarrow VC = -\frac{46x^2}{48}$$

at $x = 0$.

$VC = 0$.

at $x = 9$.

$$\Rightarrow VC = -77.625 \text{ lbs}$$

$$\Rightarrow M = \frac{1}{8} \times x \times \left(\frac{46}{24} x \right) \times \frac{1}{3} x.$$

$$\Rightarrow M = -\frac{46x^3}{144}$$

at $x = 0$

$M = 0$.

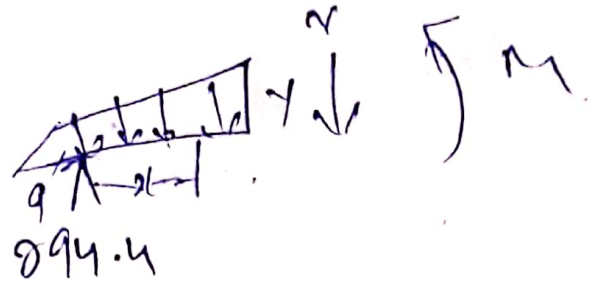
at $x = 9$.

$$M = -232.875 \text{ lbs-ft}$$

Now for section 3-2.

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for V.



$$V = \frac{46}{24} (x+9)$$

$$\text{So } \sum FV = 0 \uparrow +$$

$$894.4 - \frac{1}{2} \times (x+9) \left(\frac{46}{24} \right) (x+9) - VC = 0$$

$$V = 894.4 - \frac{.946 \times (x+9)^2}{48}$$

at $x = 0$

$$VC = 816.778$$

at $x = 15$

$$VC = \cancel{526} - 857.6$$

$$M + \frac{1}{2} \times (x+9) \left(\frac{46}{24} (x+9) + \frac{1}{3} x(x+9) \right) - 294.4x = 0$$

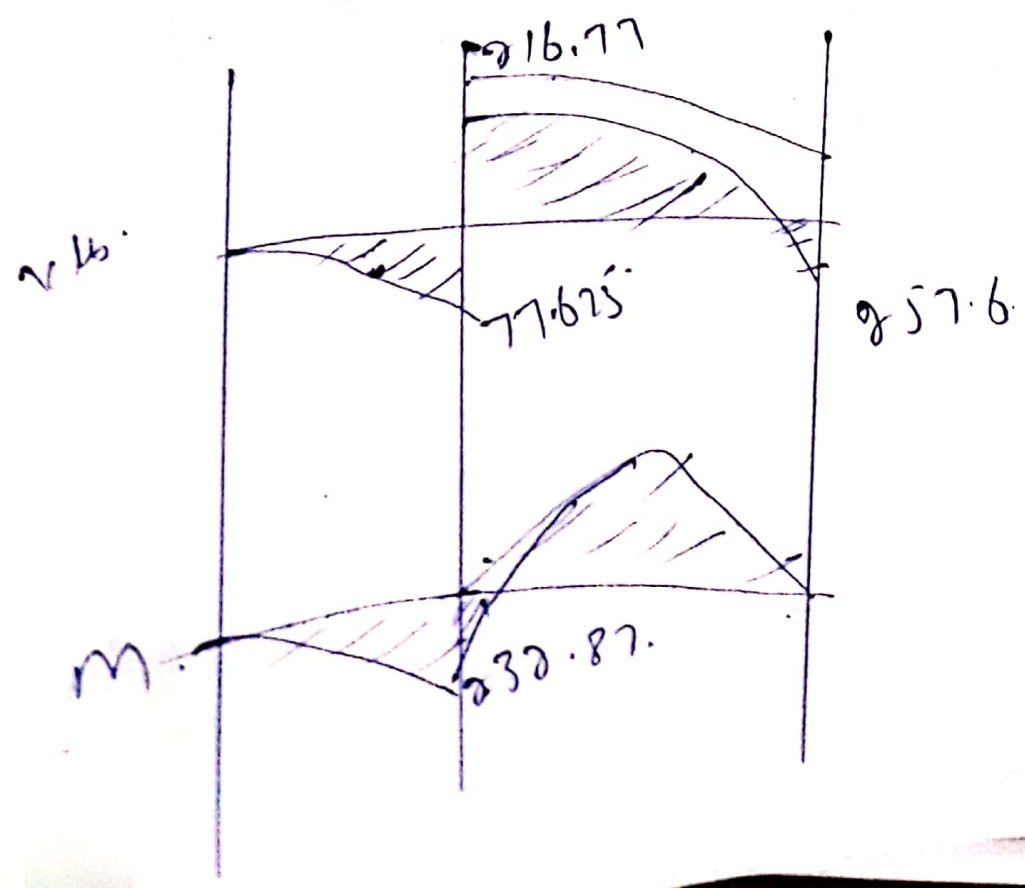
$$M = 294.4x - \frac{46(x+9)^2}{144}$$

at $x = 0$.

$$M \Rightarrow \cancel{61.625 \text{ lb ft}} \quad \boxed{232.87}$$

at $x = 15$.

$$M = \cancel{1006} \cdot 1006.25$$



Q2



Solution

$$y = \frac{w_0}{2Fu} x^2$$

$$15 = \frac{846}{2Fu} (25 - x)^2$$

$$15 = \frac{846}{2Fu} x^2$$

$$10 = \frac{846}{2Fu} (25 - x)^2$$

$$\frac{846}{2(15)} x^3 = \frac{846}{2(10)} (25 - x)^2$$

$$(28.2)x^2 = 42.3 (625 - 50x + x^2)$$

$$x^2 = 1.5 (625 - 50x + x^2)$$

$$x^2 = 937.5 - 75x + 0.5x^2$$

$$0.5x^2 - 75x + 937.5 = 0$$

Chose root $x = 25$ ft.

$$x = 13.76 \text{ ft.}$$

$$F_u = \frac{w_0}{24} x^2 = \frac{846}{2(15)} (13.76)^2$$
$$= 5339.32 \text{ lb.}$$

S-8

$$y = \frac{w_0}{24} x^2 = \frac{846}{2(5339.32)} (x^2) = 0.07922$$

$$\frac{dy}{dx} = \tan \theta_B = 0.07922x \Big|_{x=13.76}$$

$$\frac{dy}{dx} = \tan \theta_B = 0.1581x \Big|_{x=13.76} = 2.180$$

$$\theta_B = 65.3^\circ$$

$$T_B = \frac{5339.2}{\cos 65.3^\circ} = \boxed{12,779.3}$$

At A

$$y = \frac{w_0}{2F_H} x^2$$

$$= \frac{846}{2(5339.3)} x^2$$

$$\frac{dy}{dx} = \tan \theta_A = 0.158x \bigg|_{x(\theta_5 = 13.76)} = 1.780$$

$$\theta_A = 60.67^\circ$$

$$T_A = \frac{F_H}{\cos \theta_A} = \frac{5339.3}{\cos 60.67^\circ}$$

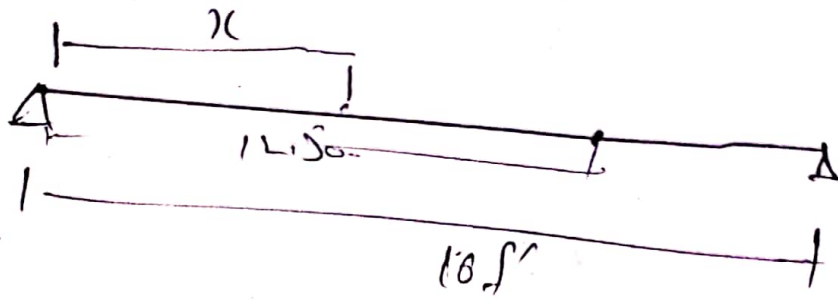
$$T_A = \boxed{10900.11}$$

$$\boxed{10900.11 \text{ lb/ft}}$$

Ans

Q3

shear force influence line for Beam.



$x = 0$, $VC = ?$



$\sum M_B = 0$

$-R_A(16) + 46(16) = 0$

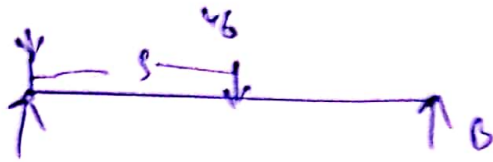
$R_A = 46$



$46 - 46 = VC = 0$

$VC = 0$

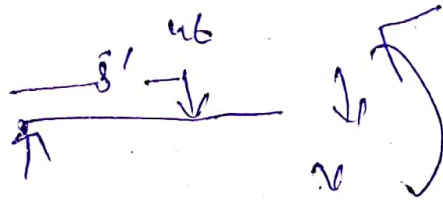
$$x_c = 5$$



$$\sum M_B = 0$$

$$-R_A(16) + 46(11) = 0$$

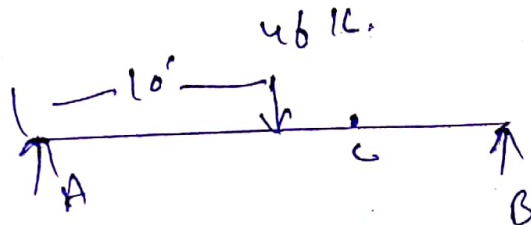
$$R_A = 31.65 \text{ k}$$



$$31.65 - 46 - V_c = 0$$

$$V_c = -14.375$$

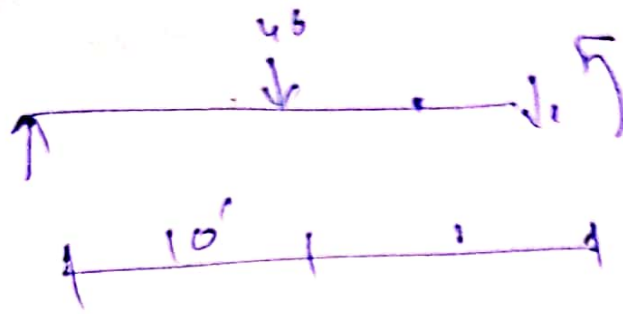
$$x = 10$$



$$\sum M_B = 0$$

$$-R_A(16) + 46(6) = 0$$

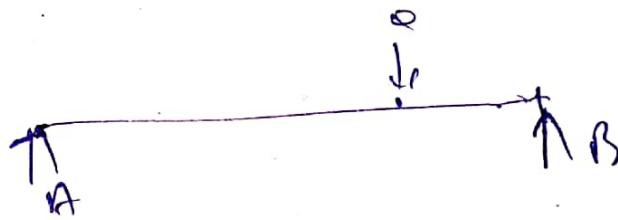
$$R_A = 17.25 \text{ k}$$



$$17.25 - 46 - VC = 0$$

$$VC = -28.75 \text{ k}$$

$$VC = 12$$



$$46(4) - RA(16) = 0$$

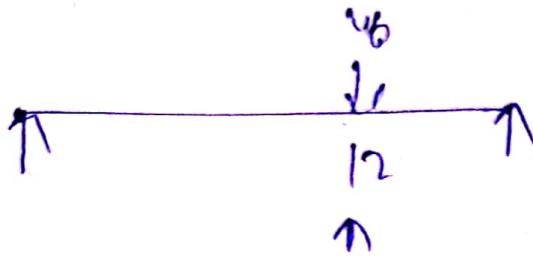
$$RA = 11.5$$



$$11.5 - 46 - VC$$

$$VC = -34.5$$

$x = 12$



$-R_A (16) + 46 (4) = 0$

$R_A = 11.5$

$\therefore 11.5 - RC = 0$

$RC = 11.5$

$x = 14$



$-R_A (16) + 46 (2) = 0$

$R_A = 5.75$



$5.75 - RC = 0$

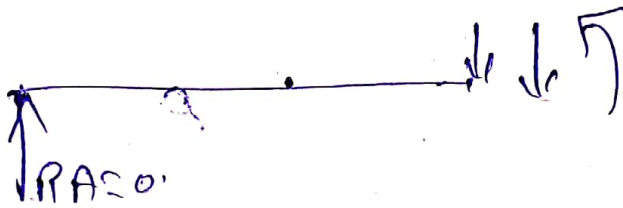
$RC = 5.75$

$$x = 16$$



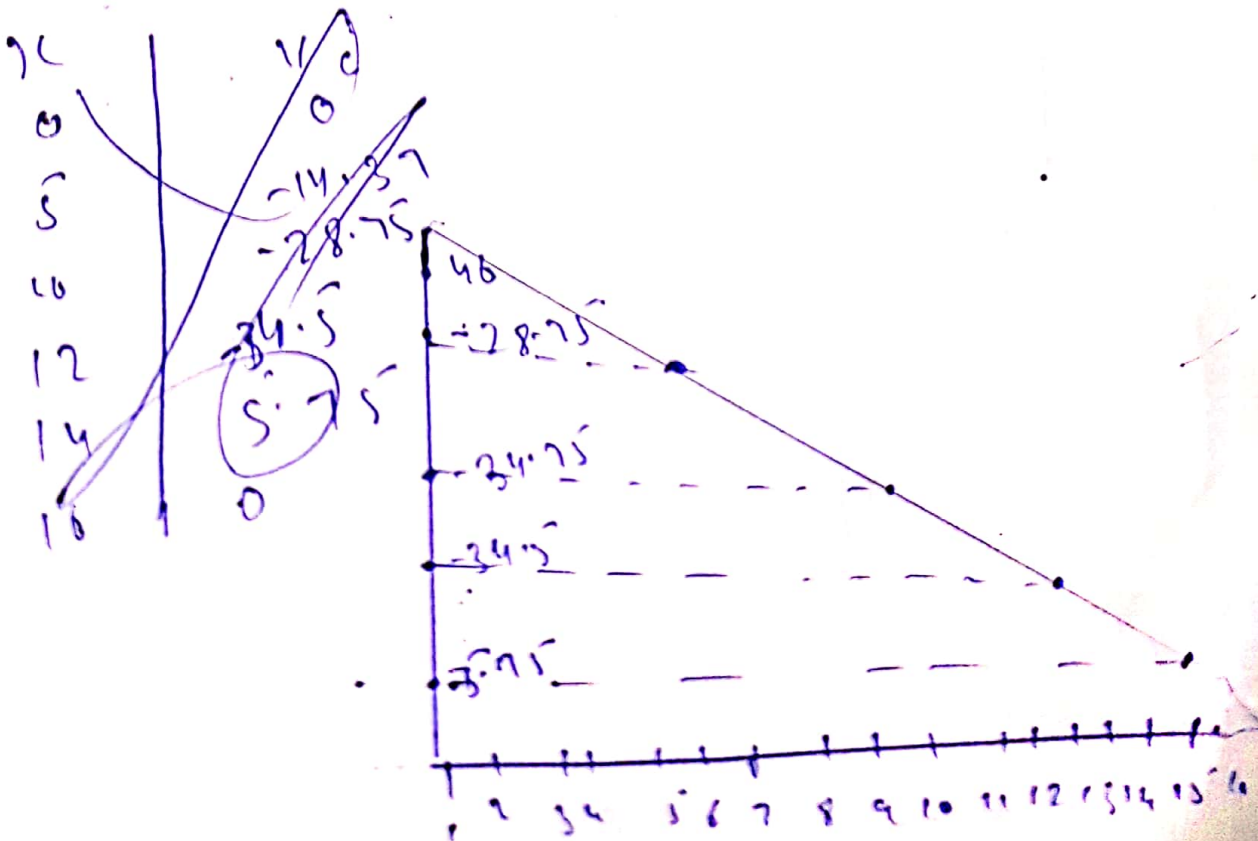
$$-RA(16) + 462(0) = 0$$

$$RA = 0$$



$$0 - VC = 0$$

$$VC = 0$$



(13)

x	u
0	0
5	-14.37
10	-28.75
12	-35.5
14	-5.75
16	0

