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SUBMITTED TO:- Engr Saqib

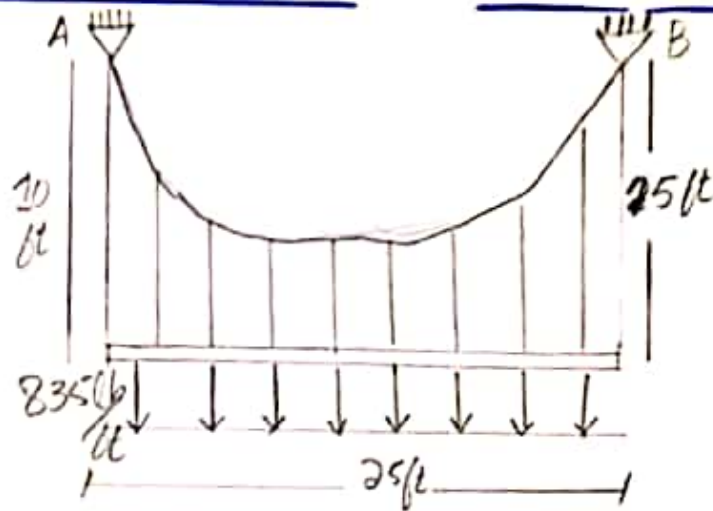
SUBJECT:- STRUCTURE ANALYSIS 1

SECTION:- B

SEMESTER 6th

DATE:- 26-09-2020

Q.2:-



Uniform load = 835 lb/ft

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

$$15 = \frac{835 x^2}{2FH}$$

$$10 = \frac{835 (25-x)^2}{2FH}$$

$$\frac{835 x^2}{2(15)} = \frac{835 (25-x)^2}{2(10)}$$

$$\frac{x^2}{30} = \frac{1}{20} (625 + x^2 - 50x)$$

$$x^2 = \frac{30}{20} (625 + x^2 - 50x)$$

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

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

$$700t < 25$$

$$x = 13.76$$

$$FH = \frac{W_0 x^2}{2y}$$

$$= \frac{835 (13.76)^2}{2(15)}$$

$$= 5269.89 \text{ lb}$$

~~AD~~ ~~B~~

$$\text{y} = \frac{\text{W}_0}{2FH}$$

$$\text{y} = \frac{835}{2(5269.89)}$$

Now we have to find the tension at given points

By using formula

$$y = \frac{W_0}{2FH} x^2$$

$$= \frac{835}{2FH} x^2$$

$$= \frac{417.5}{FH} x^2$$

Differentiate the above eq w.r.t x

$$\frac{dy}{dx} = \frac{d}{dx} \frac{417.5}{FH} x^2$$

$$= \frac{417.5}{FH} 2x$$

$$\frac{dy}{dx} = \frac{835}{FH} x$$

Also $\tan \theta = \frac{dy}{dx}$

So

$$\tan \theta = \frac{835}{FH} x$$

As point (A) is -11.24 ^{far} from point O

So at point A

$$\tan \theta_A = \frac{835}{5269.89} (-11.24)$$

$$\theta_A = \tan^{-1} (-1.780)$$

$$\theta_A = -60.68^\circ$$

Now tension at point A

$$T_A = \frac{F_H}{\cos \theta_A}$$

$$= \frac{5269.89}{\cos(-60.68)} = 10761.75 \text{ lbs}$$

$$= 10.7 \text{ kips}$$

Now point B where $x = 13.76$

$$\tan \theta_B = \frac{835}{F_H} (13.76)$$

$$= \frac{835}{5269.89} (13.76) = 2.180$$

$$\theta_B = \tan^{-1} (2.180)$$

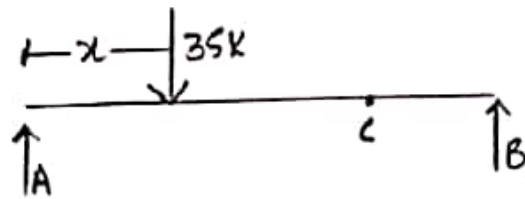
$$\theta_B = 65.35^\circ$$

Now tension at C

$$\begin{aligned}
 T_c &= \frac{F_H}{\cos \theta_a} \\
 &= \frac{5269.89}{\cos(65.35)} \\
 &= 12835.38 \text{ lbs} \\
 &= 12.63 \text{ kips}
 \end{aligned}$$

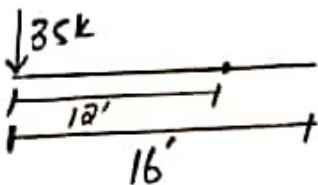
Q3:-

$$P = 35 \text{ kips}$$



$$x = 0 \quad V_L = ?$$

⇒

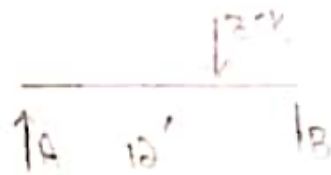


$$\sum M_B = 0$$

$$35 \times 16 - R_A (16) = 0$$

$$R_A = 35k$$

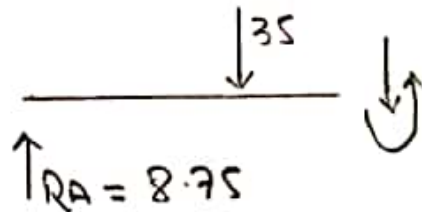
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Now $x = 12$ 

$$\left(\begin{array}{l} + \\ \curvearrowright \end{array} \right) \sum M_B = 0$$

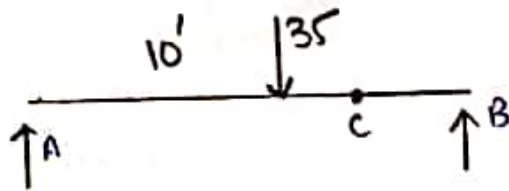
$$-R_A \times 16 + 35(4) = 0$$

$$R_A = 8.75$$



$$8.75 - 35 - V_C = 0$$

$$V_C = -26.25$$

Now $x = 10$ 

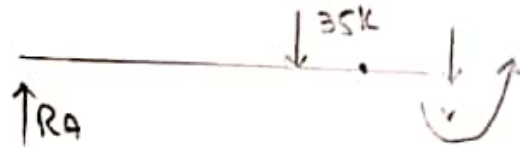
$$\left(\begin{array}{l} + \\ \curvearrowright \end{array} \right) \sum M_B = 0$$

$$V_C = ?$$

$$-R_A(16) + 35(6) = 0$$

$$R_A = 13.125 \text{ k.}$$

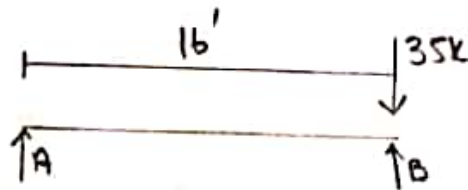
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$$13.125 - 35 - V_C = 0$$

$$V_C = -21.875$$

$$x = 16$$



$$-R_A(16) + 35(0) = 0$$

$$\Rightarrow R_A = 0$$

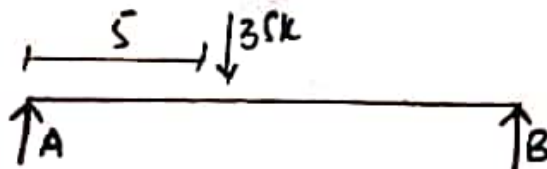
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$$0 - V_C = 0$$

$$V_C = 0$$

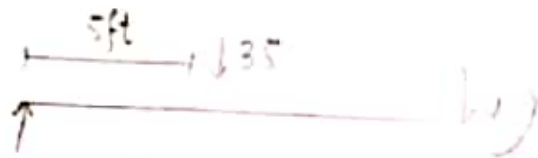
$$x = 5$$



$$\sum^+ M_B = 0$$

$$-R_A(16) + 35(11) = 0$$

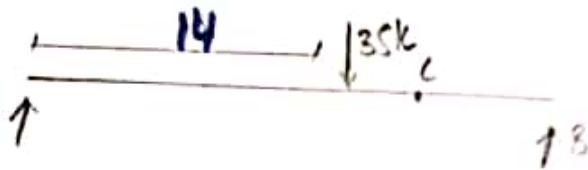
$$R_A = 24.06$$



$$24.06 - 35 - V_C = 0$$

$$V_C = -10.93$$

$$x = 14$$



$$\sum \tau_{M/B} = 0$$

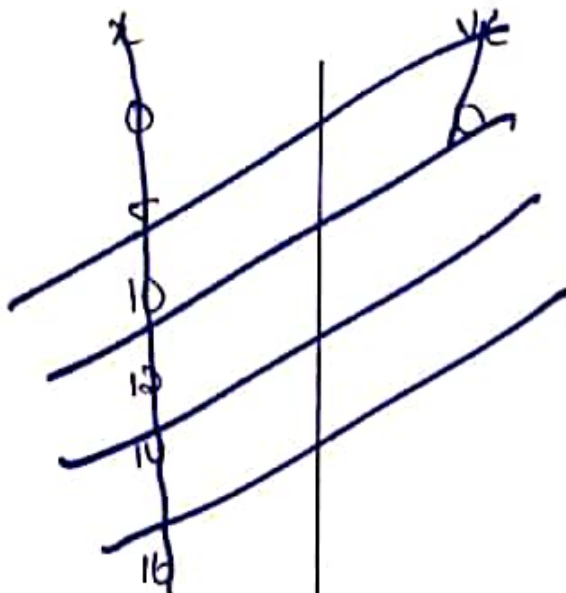
$$-RA(16) + 35 \times 2 = 0$$

$$RA = 4.375$$



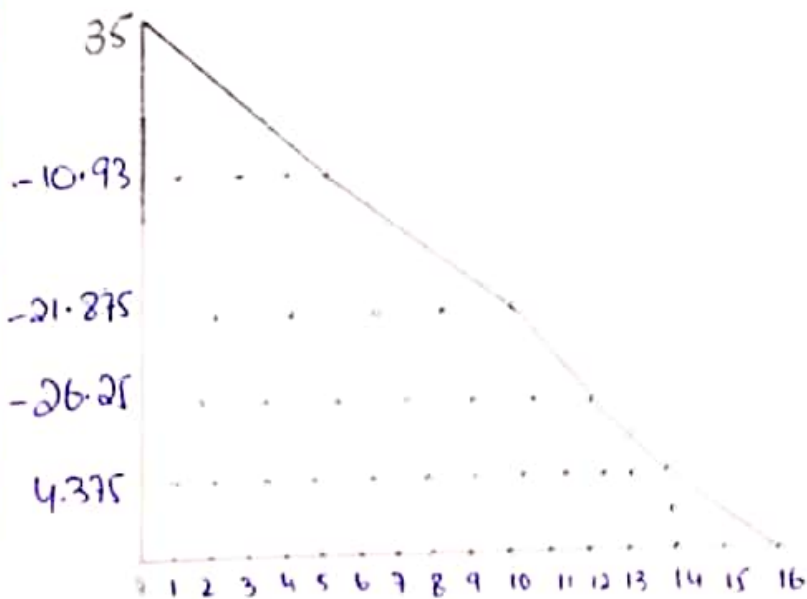
$$4.375 - V_C = 0$$

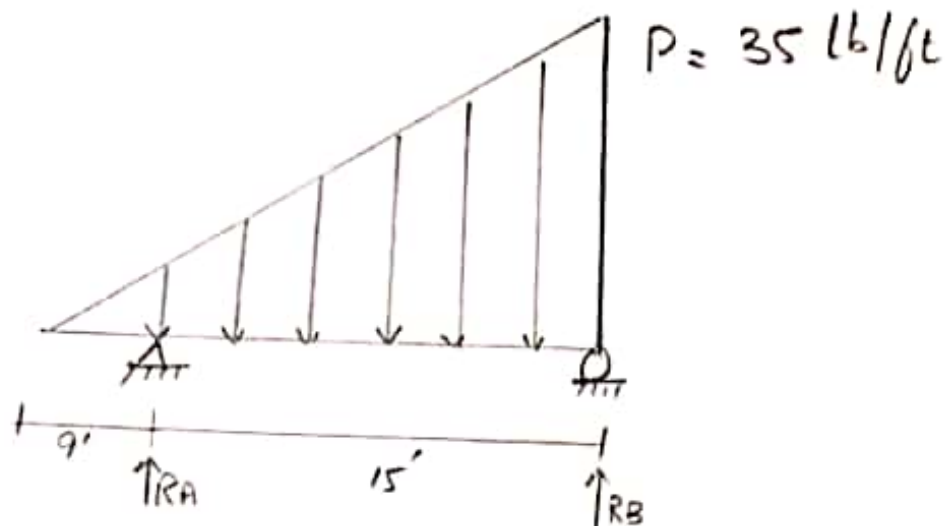
$$V_C = 4.375$$



x	vc
0	0
5	-10.93
10	-21.875
12	-26.25
14	4.375
16	0

INFLUENCE LINE OF RA





Sol:-

$$\sum F_y = 0 \quad \uparrow + \downarrow -$$

$$R_A + R_B - \frac{1}{2} (35) (24) = 0$$

$$R_A + R_B = 420 \quad - \textcircled{1}$$

$$\sum M_A = 0 \quad \downarrow + \uparrow -$$

$$-(R_B \times 15) + \left(\frac{1}{2} (35) (15') \right) \left(\frac{2}{3} \times \frac{15}{5} \right) = 0$$

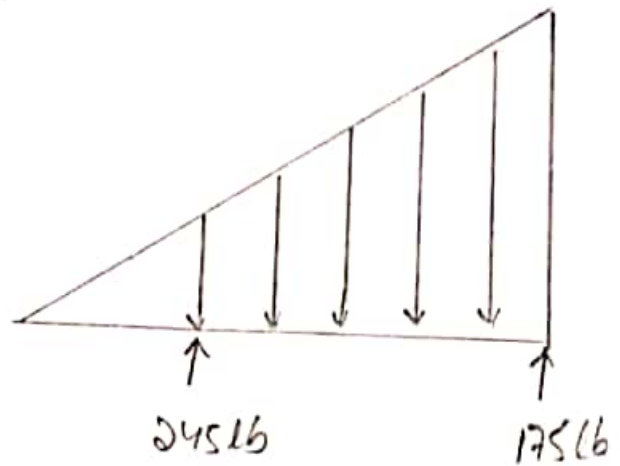
$$-15R_B + 2625 = 0$$

$$R_B = \frac{2625}{15}$$

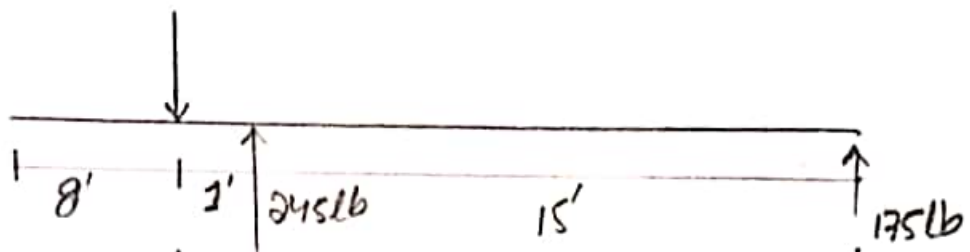
$$R_B = 175 \text{ lb}$$

put in eq $\textcircled{1}$ we get

$$R_A = 245 \text{ lb}$$



F.B.D



S.F.D

