ARSALAN KHAN

I.D NO 7614

SECTION A

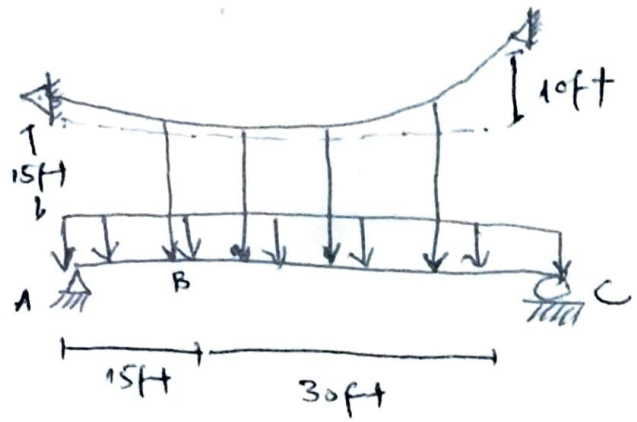
SUBMITTED TO Engr. Amjid Islam

ASSIGNMENT # 04

DATE 13- July - 2020

QUESTION NO 1:

Determine the maxi & mini tension in the parabolic cable and the force in each of the hanger. The girder is subjected to the uniform load and is pin connected at B.



Solution:

$$\stackrel{+}{\rightarrow} \Sigma F_x = 0$$

$$B_x = 0$$

Member AB

$$\Sigma F_x = 0$$

$$A_x = 0$$

moment at A

$\curvearrowright^{+} M_C = 0$

$$F_x(1) - B_y(15) - 45(4.5) = 0 \quad \text{—①}$$

FBD

$\curvearrowright M_C = 0 \; - F_H(10) - B_y(30) + (45)(30) = 0$

$$\boxed{F_H = 153.4} \qquad B_y = 0$$

$$w_o = \frac{2F_H h}{L^2} = \frac{2(153.4)(10)}{30^2}$$

$$= \frac{3068}{900} = 3.40$$

$$\boxed{w_o = 3.40 \text{ K/ft}}$$

$$F_{max} = w_o L \sqrt{1 + (L/2H)^2}$$

$$F_{max} = 3.4(30)\sqrt{1 + \left(\frac{30}{2\times 10}\right)^2}$$

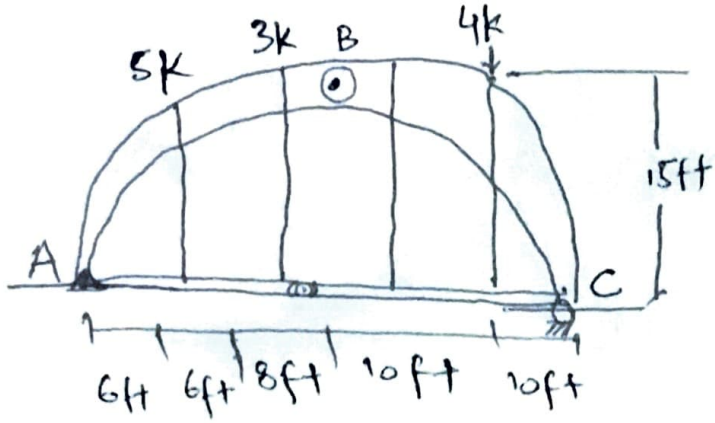
$$\boxed{F_{max} = 183.6 \text{K}}$$

Each member hanger carries 5ft

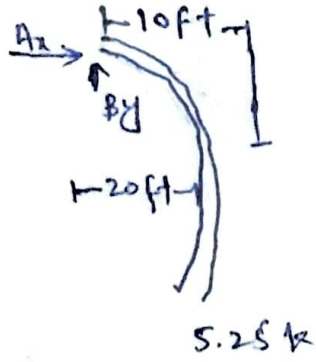
$$T = (5\text{ft})(3.4 \text{ K/ft})$$

$$\boxed{T = 17\text{k}} \quad \text{Answer.}$$

Q2: Tie three hinged arch is subjected to the loading shown. Determine the components of reaction at A and C, and the tension in the rod.



Solution:



Entire Arch:

$$\circlearrowright + \Sigma M_A = 0 \; ; \quad -4(6) - 3(21) - 5(30) + C_y\,(40) = 0$$

$$\boxed{C_y = 5.25\,k}$$

$$+\uparrow \Sigma F_y = 0$$

$$A_y + 5.25 - 4 - 3 - 5 = 0$$

$$A_y = 6.75\ K$$

$$\xrightarrow{+} \Sigma F_y = 0 \qquad A_x = 0$$

SECTION BC:

$$\circlearrowleft + \Sigma M_B = 0$$

$$-5(10) - T(15) + 5.25\ (20) = 0$$

$$\boxed{T = 3.67\ K}$$. Answer