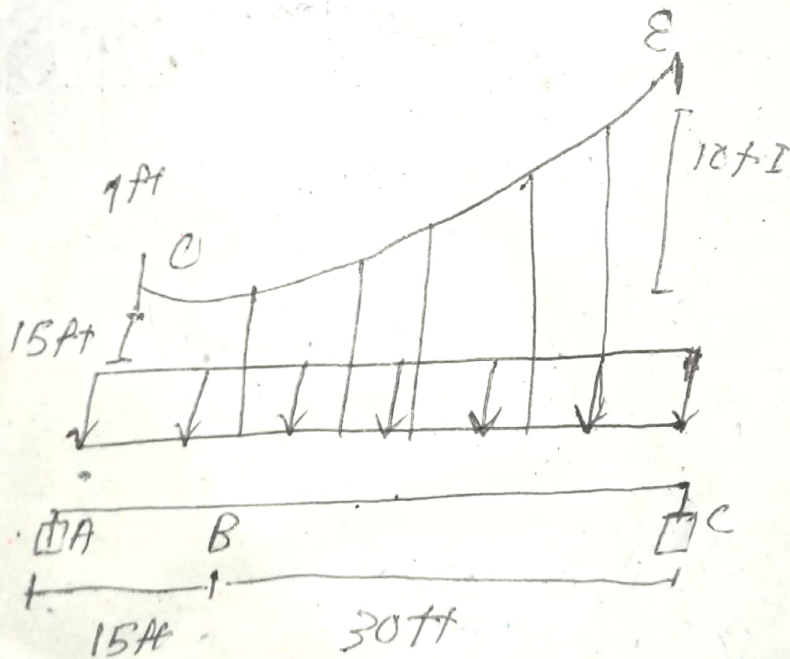


Assignment NO 4.
Cables and Arches.

Q1 :-

Determine the maximum and minimum tension in the parabolic cable and the force in each hanger. The girder is subjected to the uniform load and is pin connected at B.



MEMBER BC

$$\sum F_x = 0$$

$$B_x = 0$$

MEMBER AB:-

$$\sum F_x = 0$$

$$A_x = 0$$

MOMENT AT A.

$$\sum M_A = 0 \quad F_H(1) - B_y(15) - 45(7.5) = 0$$

FBD.

$$\sum M_C = 0 \quad -F_H(10) - B_y(30) + (45)(3) = 0$$

$$F_H = 153.04 \quad B_y = 0$$

$$W_0 = \frac{2F_H h}{L^2} = \frac{2(153.04)(10)}{30^2}$$

$$= \frac{306.08}{900} = 3.40$$

$$W_0 = 3.40 \text{ K/ft}$$

$$F_{max} = w_0 L \sqrt{1 + \left(\frac{L}{24}\right)^2}$$

$$= 3.4(30) \sqrt{1 + \left(\frac{30}{24}\right)^2}$$

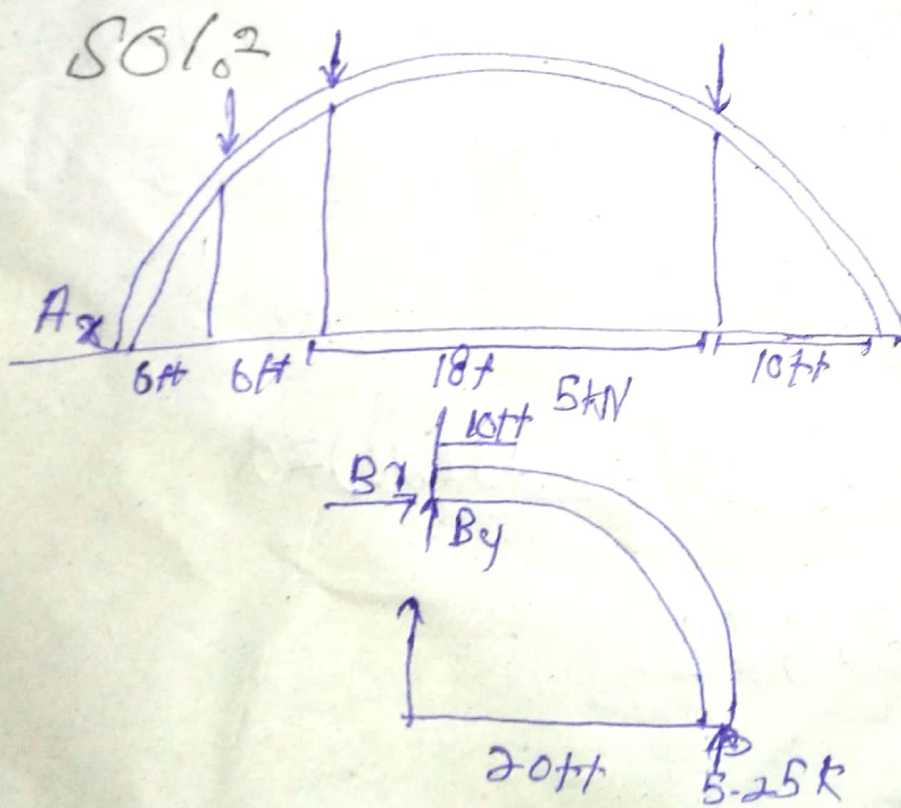
$$F_{max} = 18306 \text{ k}$$

Each hanger carries 5ft of w_0

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

$$T = 17 \text{ k}$$

Q#2 =



Entire arch:-

$$\curvearrowright + \sum M_A = 0: -4(8) - 3(9) - 5(30) + y(48) = 0$$

$$Cx = 5.25 \text{ k}$$

$$+ \uparrow \sum F_y = 0,$$

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

$$Ay = 6.75 \text{ k}$$

$$\curvearrowleft \sum F_x = 0$$

$$Ax = 0$$

Solve BC:-

$$\curvearrowright + \sum M_B = 0:$$

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

$$T = 3.67 \text{ k}$$