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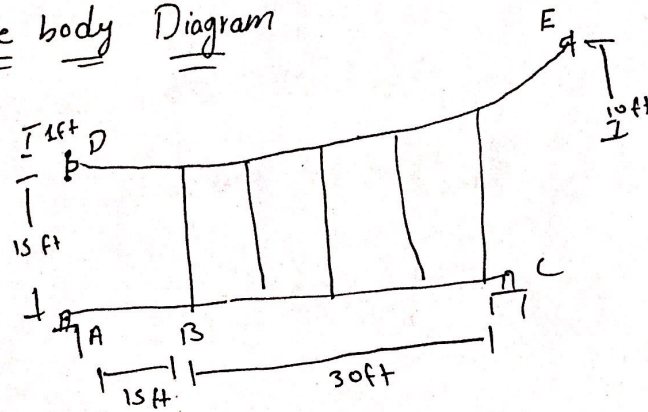
Subject = Structural analysis

Assignment No = 04

Question no 2

Question No 1

Free body Diagram



Solution

$$\rightarrow \sum F_x = 0;$$

$$B = 0$$

Member AB;

$$\rightarrow \sum F_x = 0;$$

$$A = 0$$

FBD 1:

$$\rightarrow \sum M_A = 0;$$

$$F_H(1) - B_y(15) - 30(75) = 0$$

FBD 2

$$\sum M_c = 0$$

$$-F_u(10) - B_y(30) + 90(15) = 0$$

Sol

$$B_y = 0;$$

$$F_H = F_{max} = \boxed{22k}$$

Maxible force occure on E where slope is the maximum -

From eq 5.8

$$w_0 = \frac{2 F_u h}{E^2} = \frac{3(225)(10)}{30^2}$$

$$= 7.5k/ft$$

from eq 5-11

$$F_{max} = w_0 L = \sqrt{1 + \left(\frac{L}{2n}\right)^2}$$
$$= 3(30) \sqrt{1 + \frac{30}{3(10)}}^2$$

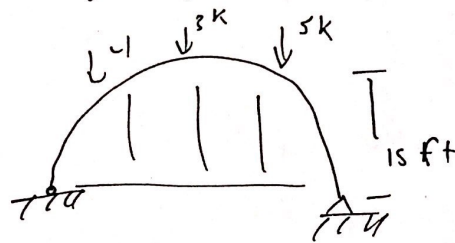
$$F_{max} = 127.2 \text{ k}$$

Each bearing carries 5 ft of w_0 .

$$T = (3 \text{ k/ft})(5) = 10 \text{ k}.$$

Question No 2

Free body diagram



Solution

Entire arch

$$\sum \curvearrowright + M_A = 0;$$

$$-4(6) - 3(12) - 5(20) + Ay(40) = 0$$

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

$$Ay + 5 \cdot 25 - 4 - 3 - 5 = 0$$

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

$$\sum F_x = 0;$$

$$Ax = 0$$

Section BC

$$\sum \curvearrowright + \sum M_B = 0; \quad -5(10) - T(15) + 5 \cdot 25(20) = 0$$

$$\boxed{T = 3.67}$$