

Submitted By

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Bec

SECTION

"A"

Paper

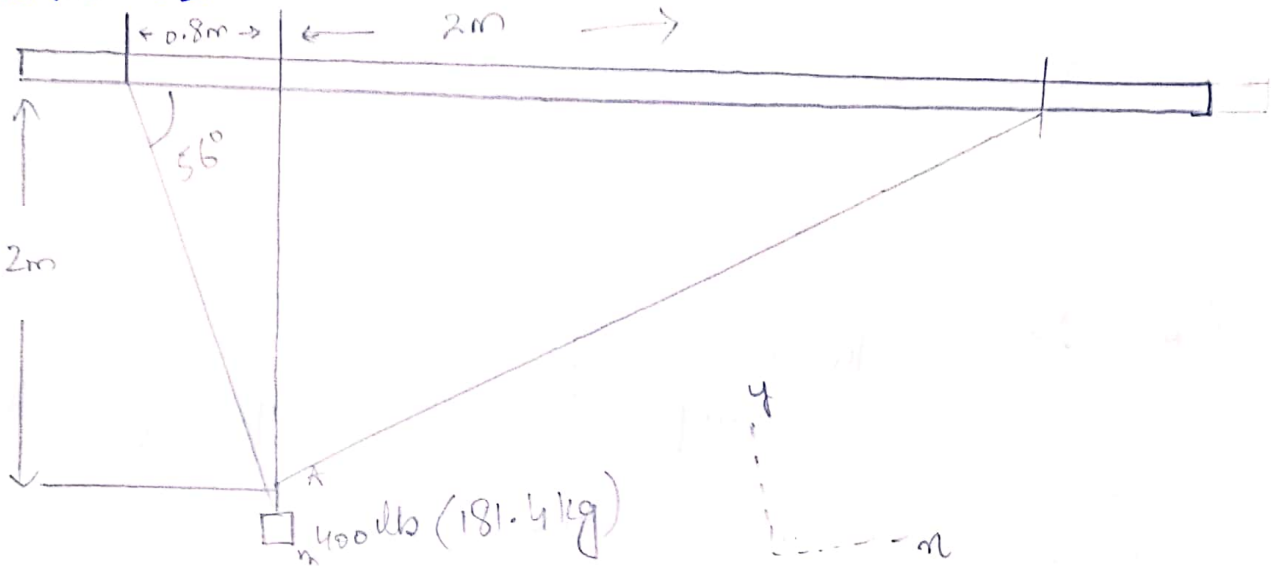
Engineering Mechanics

Submitted To

Sir Majid Naeem

Question: 1

Pg # 1



Solution :-

$$\sum L_x = T_2 x - T_1 x$$

$$0 = T_2 x - T_1 x$$

$$T_2 x = T_1 x$$

$$T_1 \cos \theta = T_2 \cos \theta$$

$$T_1 \cos 56^\circ = T_2 (0.866)$$

$$\underline{T_1 = 1.546 T_2} \text{ equation (i)}$$

$$\sum F_y = T_{1y} + T_{2y} - w$$

$$w = T_{1y} + T_{2y}$$

$$mg = T_1 \sin \theta + T_2 \sin \theta$$

$$mg = T \sin (56) + T_2 (0.5)$$

$$1777.72 = 1.3 T_2 + 0.5 T_2 \therefore T_1 = 1.546 T_2$$

$$\frac{1777.72}{1.8} = \frac{1.8}{1.8} T_2$$

$$T_2 = 987.6 \rightarrow 2 \text{ Put in eq (i)}$$

$$T_1 = 1.546 (987.6)$$

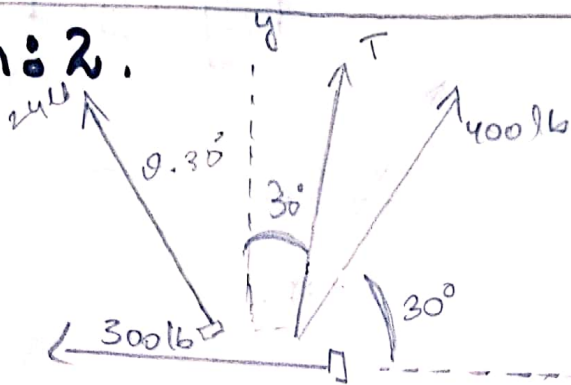
$$T_1 = 1.546 (987.6)$$

$$T_1 = 1526.8$$

Percentage of cable

AB is 85.88%

Question: 2.



Solution :- we take $\theta = 30^\circ$ because in the figure they are for x -component forces corresponding angles

$$\sum F_x = 0$$

$$0 = -360 - 240 \sin 30^\circ + T_1 \cos 30^\circ + 400 \cos 30^\circ$$

$$0 = -360 - 120 + 0.866 T_1 + 346.41$$

$$\frac{0.866 T_1}{0.866} = \frac{133.59}{0.866}$$

$$T_1 = 153.55 \rightarrow (i)$$

Now y -component force.

$$\sum F_y = 0$$

The given force is 600 pounds in y direction

$$600 = 240 \cos 30^\circ + T_2 \sin 30^\circ + 400 \sin 30^\circ$$

$$600 = 207.84 + 0.5 T_2 + 200$$

$$600 - 407.84 + 0.5 T_2 = 200$$

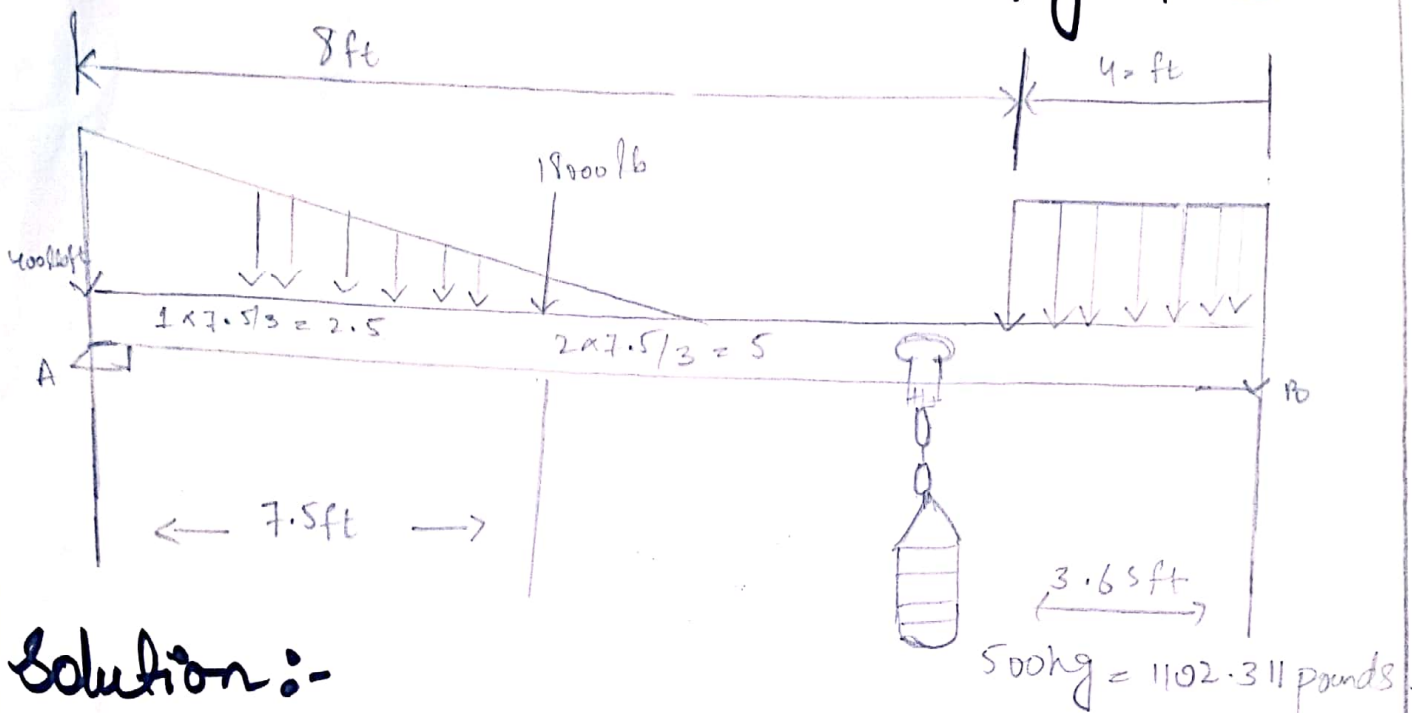
$$\frac{192.16}{0.5} = \frac{0.5 T_2}{0.5}$$

$$T_2 = 384.32 \rightarrow (ii)$$

Now eq (ii) - (i)

$$T = 384.32 - 153.55$$

$$T = 230.7$$



Solution:-

$$\text{Resultant UDL} = 400 \times 7.5/2 = 1500$$

$$\text{Resultant UDL} = 300 \times 3.65 = 1095$$

$$R_{1x} = 0 \quad \sum F_x = 0 \rightarrow (i)$$

$$R_{1y} + R_{2y} - 1500 - 18000 - 1095 - 1102.311 = 0 \text{ eq (ii)} ; \sum F_y = 0$$

$$(R_{2y} \times 12) - (1500 \times 2.5) - (18000 \times 7.5) - (1095 \times 9.825) - (1102.311 \times 9.825) = 0$$

$$12R_{2y} - 3750 - 135000 - 10758.375 - 8818.48 = 0$$

$$\frac{12R_{2y}}{12} = \frac{158326.855}{12}$$

$$\boxed{R_{2y} = 13194 \text{ Pounds}} \quad \text{Put the value in eq (ii)}$$

$$R_{1y} + 13194 - 1500 - 18000 - 1095 - 1102.311 = 0$$

$$\boxed{R_{1y} = 8503.311 \text{ Pounds}}$$