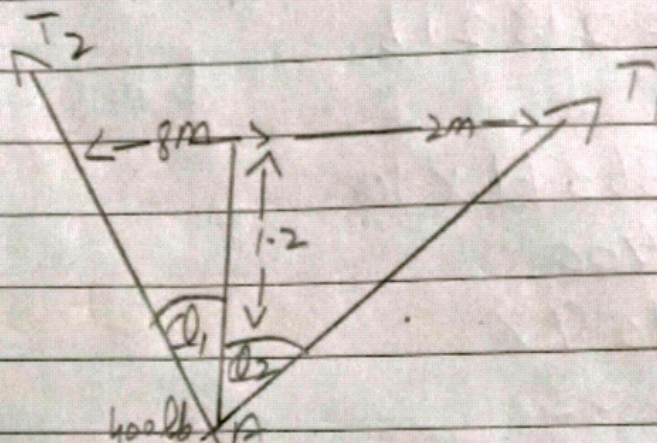


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Section: - B



$$\tan \alpha_1 = \frac{0.8m}{1.2} \Rightarrow \alpha_1 = 33.7^\circ$$

$$\tan \alpha_2 = \frac{2m}{1.2m} \Rightarrow \alpha_2 = \tan^{-1}\left(\frac{2m}{1.2m}\right) = 59^\circ$$

$$\vec{w} = -400 \text{ lb } \hat{j} \rightarrow \text{A}$$

$$\vec{T}_2 = -T_2 \sin 33.7^\circ \hat{i} + T_2 \cos 33.7^\circ \hat{j}$$

$$\vec{T}_1 = T_1 \sin 59^\circ \hat{i} + T_1 \cos 59^\circ \hat{j}$$

$$\vec{w} + \vec{T}_1 + \vec{T}_2 = 0$$

$$+400 \text{ lb } \hat{j} = (T_2 \cos 33.7^\circ + T_1 \cos 59^\circ) \hat{j} \rightarrow \text{A}$$

$$0 = -T_2 \sin 33.7^\circ + T_1 \sin 59^\circ$$

$$T_1 \sin 59^\circ = T_2 \sin 33.7^\circ \rightarrow \text{B}$$

$$T_1 = 0.6 T_2 \rightarrow \text{D}$$

Put in eq (A)

$$400 = 0.8 T_2 + 0.5(0.6 T_2)$$

$$400 = 0.8 T_2 + 3 T_2$$

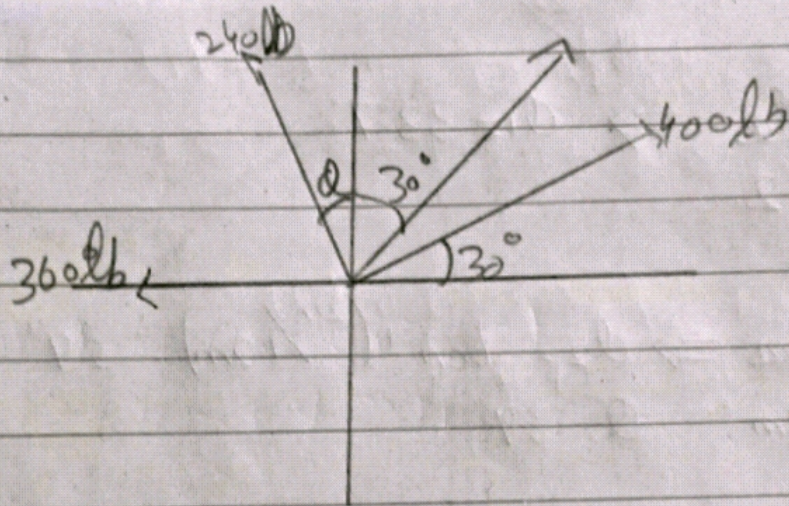
$$11 T_2 \Rightarrow T_2 = 363.61 \text{ lb}$$

$$T_1 = 218.21 \text{ lb}$$

$$\text{Percentage} = \frac{363.61}{400} \times 100$$

$$= 90.9\%$$

Q2:-



$$\sum F_x = 0$$

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

$$-240 \sin \theta + (0.5)T + 346.4 = 360$$

$$-240 \sin \theta + 0.5T = 360 - 346.4$$

$$-240 \sin \theta + 0.5T = 13.6 \rightarrow (1)$$

$$\sum F_y = 0$$

$$240 \cos \theta + T \cos 36 + 400 \sin 30^\circ = 600$$

$$240 \cos \theta + (0.866)T + 400(0.5) = 600$$

$$240 \cos \theta + 0.866T + 200 = 600$$

$$240 \cos \theta + 0.866T = 600 - 200$$

$$240 \cos \theta + 0.866T = 400 \rightarrow (2)$$

$$-240 \sin \theta + 0.5T = 13.6 \rightarrow (i)$$

$$240 \cos \theta + 0.866T = 400 \rightarrow (ii)$$

From sol of eq (i) & (ii)

$$\boxed{\theta = 21.7^\circ}$$

Put $\theta = 21.7^\circ$ in eq (i)

$$-240 \sin(21.7) + 0.5T = 13.6$$

$$-88.7 + 0.5T = 13.6$$

$$0.5T = 13.6 + 88.7$$

$$0.5T = 102.3$$

$$T = \frac{102.3}{0.5}$$

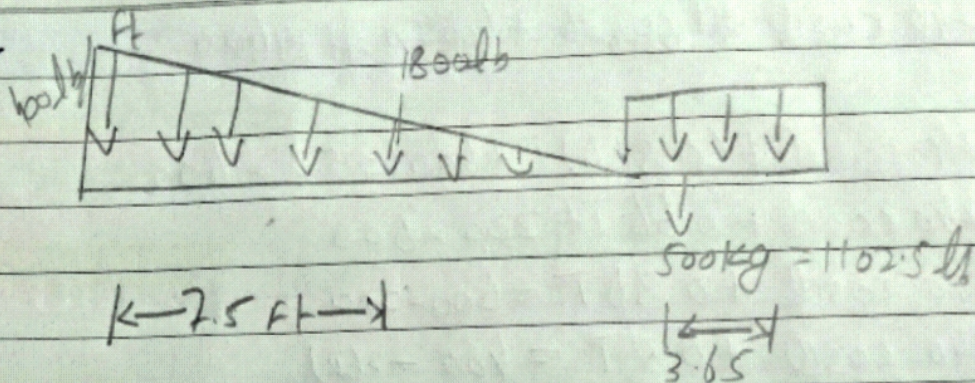
$$0.5$$

$$T = 204.6 \text{ lb}$$

$$\boxed{\theta = 21.7}$$

$$\boxed{T = 204.6 \text{ lb}}$$

Q3-



$$R_A = R_B = ?$$

$$\sum M_b = 0 \quad (\uparrow)$$

$$-(1200 \times 2) - (1102.5 \times 3.65) \\ -(1600 \times 9.33) + 12 R_A = 0$$

$$R_A = 1779.34 \text{ lbs}$$

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

$$R_A + R_B - 1600 - 1200 - 1102.5 = 0$$

$$R_B = 2123.16 \text{ lbs}$$