

1

Date: ___/___/20___

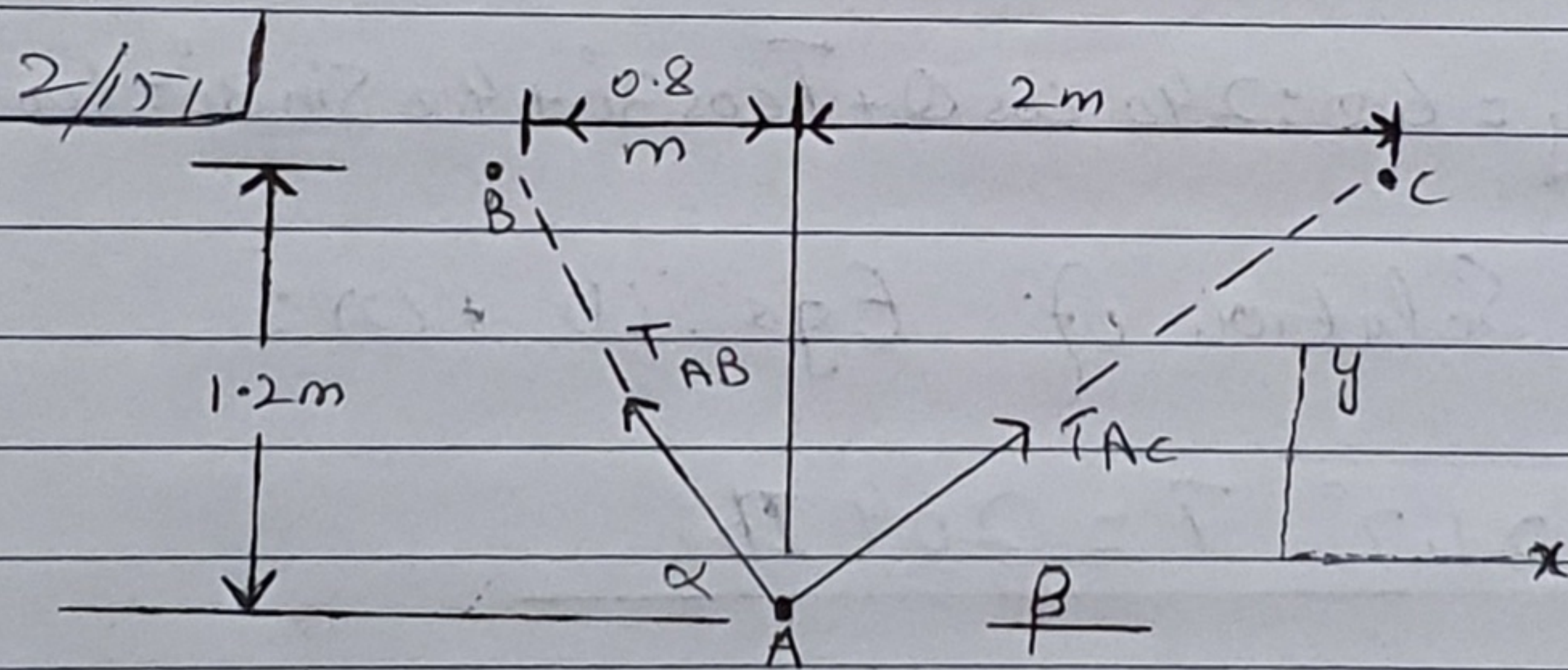
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Subject: Engineering Mechanics

Section: "B" Department: "civil"

Qno 1



Soln

$$\alpha = \tan^{-1} \left(\frac{1.2}{0.8} \right) = 56.3^\circ$$

$$\beta = \tan^{-1} \left(\frac{1.2}{2} \right) = 31.0^\circ$$

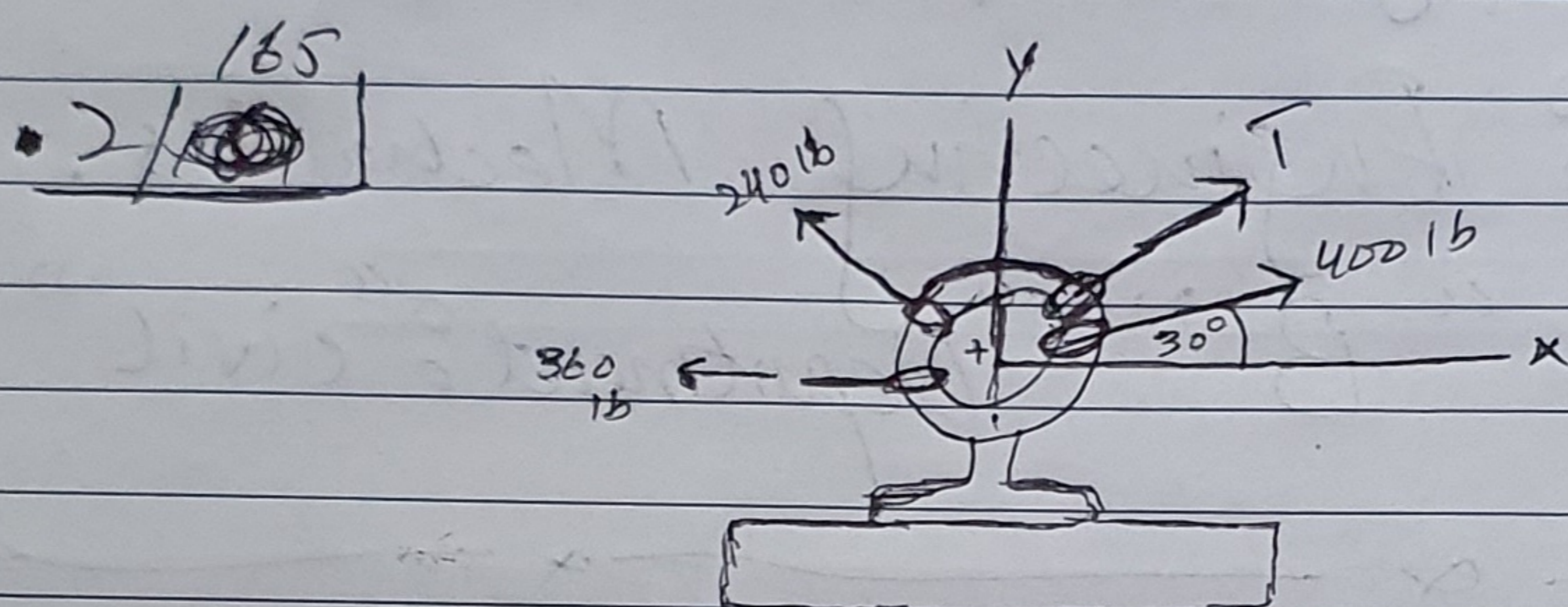
$$\begin{aligned} \underline{T}_{AB} &= T_{AB} \underline{n}_{AB} = 0.858 (60) (9.81) \\ &\quad [\cos 56.3^\circ \underline{i} + \sin 56.3^\circ \underline{j}] \\ &= -280 \underline{i} + 420 \underline{j} \text{ N} \end{aligned}$$

$$\begin{aligned} \underline{T}_{AC} &= T_{AC} \underline{n}_{AC} = 0.555 (60) (9.81) \\ &\quad [\cos 31.0^\circ \underline{i} + \sin 31.0^\circ \underline{j}] \\ &= 280 \underline{i} + 168.1 \underline{j} \text{ N} \end{aligned}$$

(2)

Date: ___/___/20

Qno 2



Solⁿ $\sum F_x = 0 : -360 - 240 \sin \theta + T \sin 30^\circ + 400 \cos 30^\circ = 0$ (1)

$$\sum F_y = 600 : 240 \cos \theta + T \cos 30^\circ + 400 \sin 30^\circ = 600$$
 (2)

Numerical Solution of Eqs. (1) + (2):

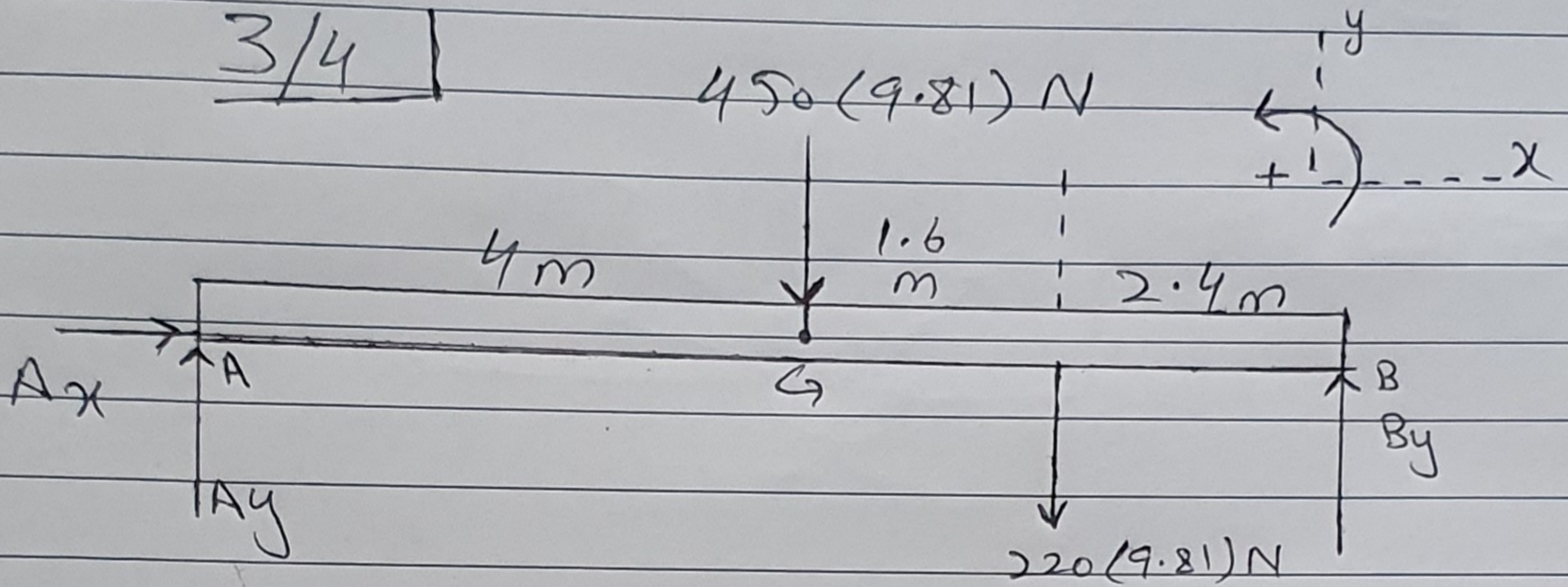
$\theta = 21.7^\circ$ $T = 204 \text{ lb}$

(we could eliminate T between Eqs. (1) & (2), but the resulting equation is still transcendental).

3

Date: ___/___/20___

Q no 3



Solⁿ From $\sum F_x = 0$, $A_x = 0$

$$\sum M_A = 0: -450(9.81) - 220(9.81)(5.6) + B_y(8) = 0, \quad \underline{B_y = 3720 \text{ N}}$$

$$\sum F_y = 0: A_y - 450(9.81) - 220(9.81) + 3720 = 0$$

$$\underline{A_y = 2850 \text{ N}}$$

The End