Name = Faraz Khan

ID = 16087

Dpt = BSc

Section = "A"

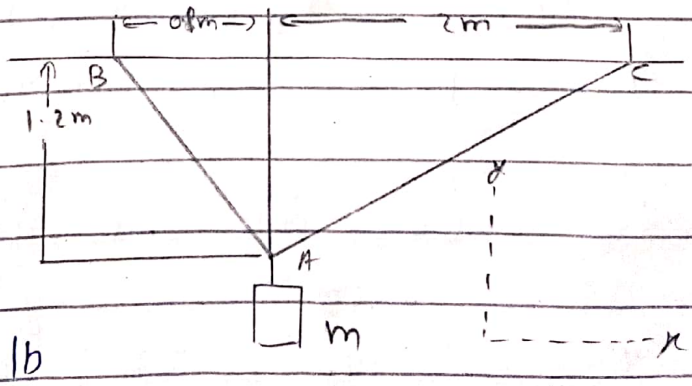
Paper = Engineering Mechanics.

Submitted to = Sir majid

Q No 1

Part (A)

Given data:-



m = 400 lb

Scanned with CamScanner

Increase of volume => $n_{AB} = 15\%$

Increase of volume => $n_{AC} = 35\%$

Required:-

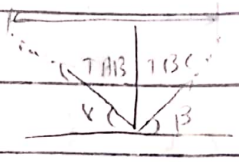
$AB = ?$

$BC = ?$

Solution:

$$\gamma = \tan^{-1}\frac{1.2}{0.8}$$

$$\gamma = 56.3^\circ$$



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

$$\beta = 31.0^\circ$$

We know that

$$m = 400\ lb \Rightarrow \frac{400}{2.204} = 181.48\ kg$$

$$T_{AB} = T_{AB}\,\lambda_{AB} = 0.15 \times (181.48)(9.81)\left(-\cos 56.3 i \times \sin 56.3 j\right)$$

$$= 267.047\,(-0.55i + 0.83j)$$

$$(T_{AB} = -146.67i + 221j\ N)$$

$$T_{AC} = T_{AC}\,\lambda_{AC} = 0.35(181.48) \times (9.81)\left\{-\cos 31 i + \sin 31 j\right\}$$

$$T_{AC} = (623.11)\{-0.857i + 0.515j\}$$

$$T_{AC} = -534i + 320j\ N$$

$$T_{AB} = -14x\,i + 221j\ N$$

Scanned with CamScanner

$T_{AC} = -534i + 320j$ N

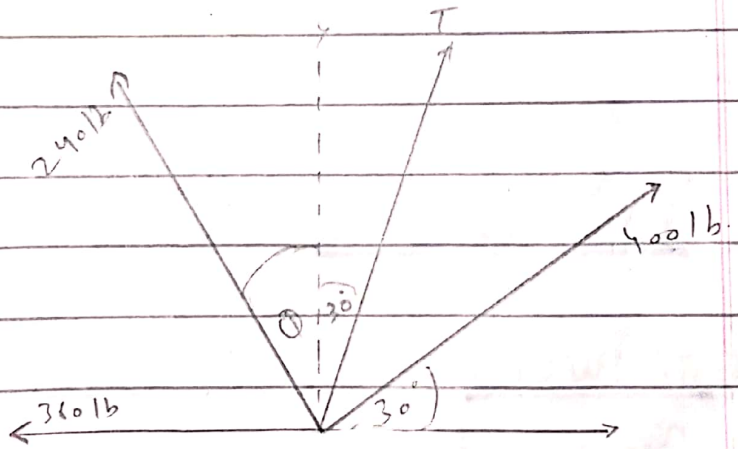
Part B :-

If the water tank Increase than weight 10%. Their stability is no durable.

Q No (2)

ANSWER:-

Given data:-



Sheet of bold = 600 lb.

P.T.O

Scanned with CamScanner

Required

$T = ?$

$\theta = ?$

Solution:

$\Sigma F_x = 0 = -360 - 240 \sin\theta - T\sin 30 + 400\cos 30 = 0$

$\Sigma F_y = 0 = 240\cos\theta + T\cos 30° + 400\sin 30 = 0$

Numerical solution of equation 1 & 2

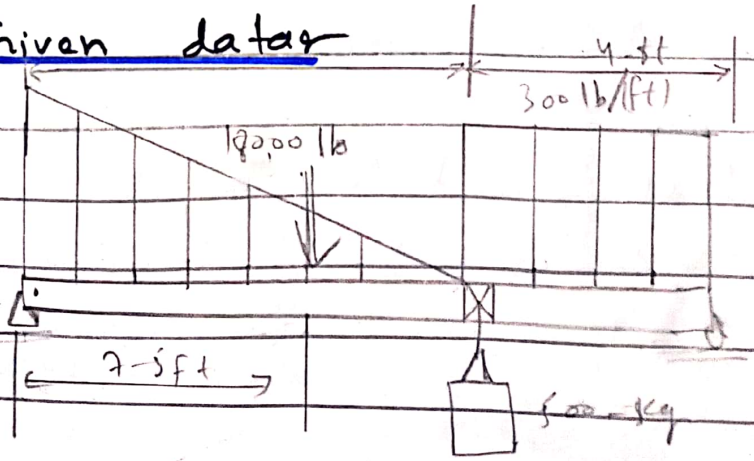
$\theta = 21.7°$ $\quad T = 204$ lb

Notes: we could eliminate T between equation 1 & 2 the resulting equation transcendental.

Q No 3

ANSWER:

Given data:



Scanned with CamScanner

Required data:

$A_y = ?$

$B_y = ?$

Solutions:

UDL = convert to point load

$\Rightarrow 300 \times 4 = 1200 lb$

at point $= \frac{1}{2} \times 4 = 2'$ from B

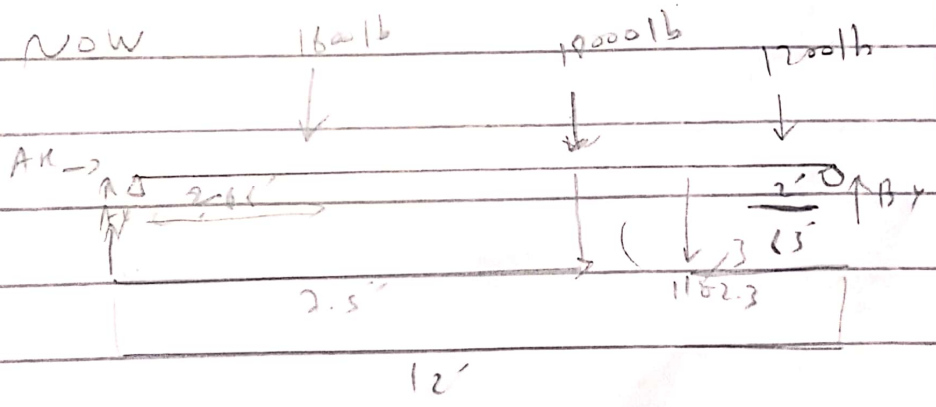
$\Rightarrow$ UVL $= \frac{1}{2} \times 400 \times 8 = 1600$

from A

$\Rightarrow$ one load in kg

convert to lb

$= 500 \times 2.204 = 1102.31 lb$



$\Sigma A_x = 0$

$A_x = 0$

$\Sigma M_A = -1600 \times 2.66 - 18000 \times 7.5 - 1200 \times 10 - 1102.31 \times 8.35 + B_y \times 12$

Scanned with CamScanner

$= -160460 + By \times 12$

$By = \frac{160460}{12}$

$By = 13371.69\ lb$

$Ay = \Sigma$ Total load $- By$

$Ay = 1200 + 1102.31 + 18000 + 1600 - 13371.69$

$Ay = 8530.31\ lb$

$Ay = 8530.31 \quad By = 13371.69$

Scanned with CamScanner