Date:

Day: M T W T F

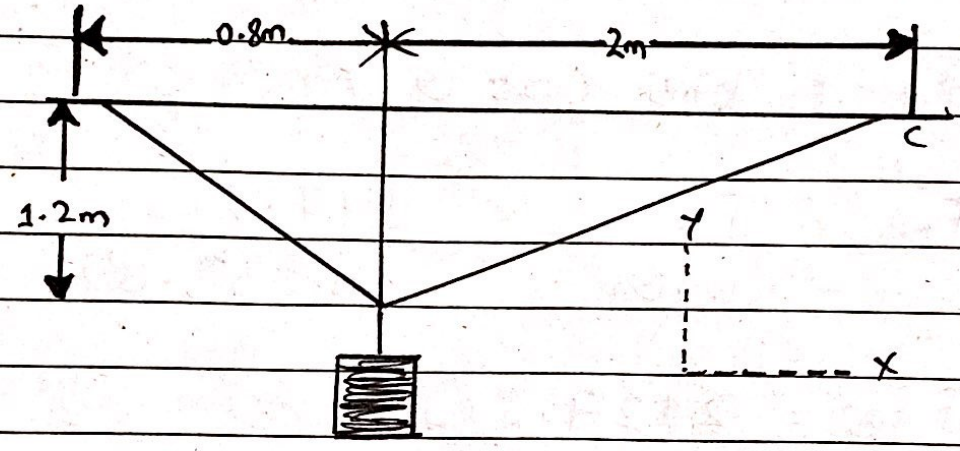
Name:- Fahad M. Irshad.

I.D :- 7379

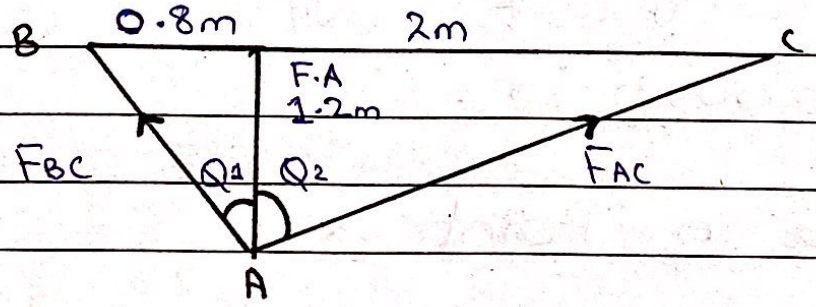
Subject :- Engineering Mechanics.

Instructor :- Sir Engr. M. Majid Naeem

Q1:- Two high strength ..... result of Part a (3).



Solution :- Part A



$$\theta_1 = \tan^{-1}\left(\frac{0.8}{1.2}\right)$$

$$\theta_1 = 33.6^\circ$$

$$\theta_2 = \tan^{-1}\left(\frac{2}{1.2}\right)$$

$$\theta_2 = 59.0^\circ$$

Resolve the component.

$$F_A = F_{AC} \cos\theta_2$$

$$F_{AC} = \frac{F_A}{\cos\theta_2} = \frac{1773.8\,N}{\cos(59.0°)}$$

$$F_{AC} = 3444.0\,N$$

$$F_A = F_{AB} \cos\theta_1$$

$$F_{AB} = \frac{F_A}{\cos\theta_1} = \frac{177.8\,N}{\cos(33.6°)}$$

$$F_{AB} = 2129.6\,N.$$

Percentage of weight carried by AB above is.

Force in Point A.

$$F_A = mg$$

$$F_A = (400)(9.8)$$

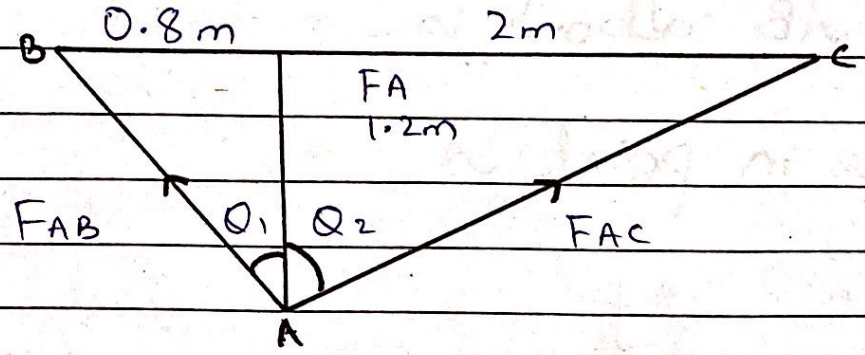
$$F_A = 3920$$

Percentage of weight.

$$F_{AB} = \frac{2129}{3920} \times 100$$

$F_{AB} = 54.31\ \%$

Solution : Part B :-



$$\theta_1 = \tan^{-1}\left(\frac{0.8}{1.2}\right)$$

$$\theta_1 = 33.6°$$

$$\theta_2 = \tan^{-1}\left(\frac{2}{1.2}\right)$$

$$\theta_2 = 59.0°$$

Resolve the components

$$F_A = F_{AC} \cos\theta_2$$

$$F_{AC} = \frac{F_A}{\cos\theta_2} = \frac{1773.8\,N}{\cos(59.0°)}$$

$$F_{AC} = 3444.0\,N$$

$$F_A = F_{AB} \cos\theta_1$$

$$F_{AB} = \frac{F_A}{\cos\theta_1} = \frac{1773.8\,N}{\cos(33.6°)}$$

$F_{AB} = 2129.6\ N$

Percentage of weight carried by AB above is.

force in point A

$F_A = mg$

$F_A = (340\ pound)(9.8)$

$F_A = 3332$

Percentage of weight

$$F_{AB} = \frac{2129}{3332} \times 100$$

$F_{AB} = 63.8\ \%$

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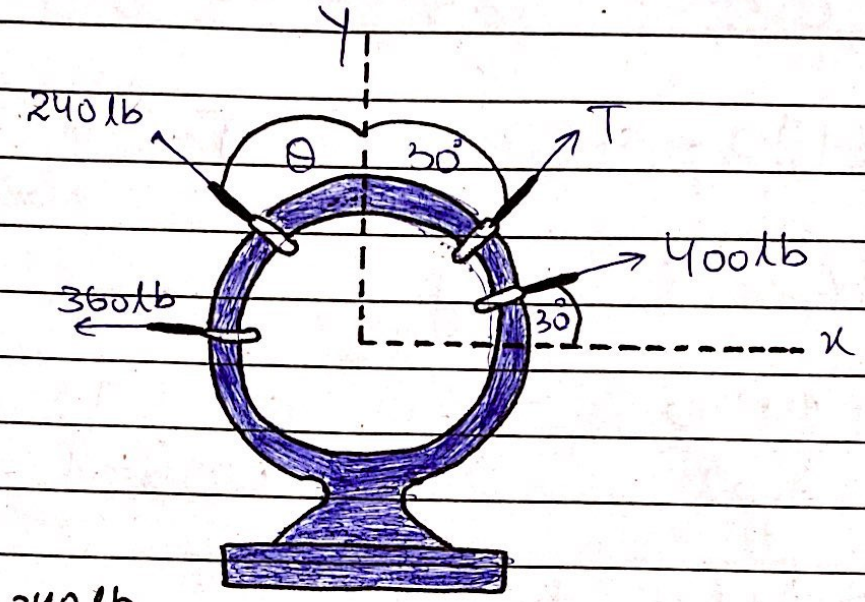
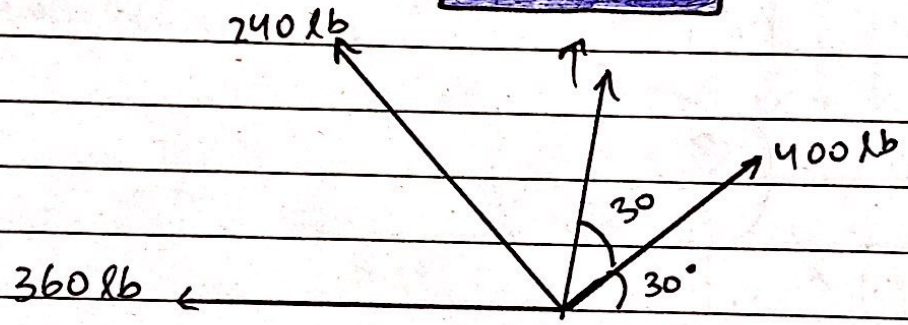
Q No. 2:- four forces are ..... ----- value of T and.





$$-600\,lb = 400 \sin 30° + \frac{T \cos 30}{0.866} + 240 \cos\theta$$

$$600\,lb = 200 + 0.86T + 240 \cos\theta$$

$$400\,lb = 0.866T + 240 \cos\theta \quad \text{---(i)}$$

$$360\,lb = 240 \sin\theta - T \sin\theta - \frac{400 \sin 30}{200}$$

$$560 = 240 \sin\theta - 0.5T \quad \text{---(ii)}$$

$$\text{(i)}\quad \frac{400\,lb}{0.866} = \frac{0.866T}{0.866} + \frac{240 \cos\theta}{0.866}$$

$$462 = T + 277.14 \cos\theta \longrightarrow (iii)$$

(ii) $$\frac{560}{0.5} = \frac{240 \sin\theta}{0.5} - \frac{0.5T}{0.5}$$

$$1120 = 480 \sin\theta - T \longrightarrow (iv)$$

Divide (iv) by (iii)

$$\frac{1120}{462} = \frac{480 \sin\theta - T}{277.14 \cos\theta + T}$$

$$2.42 = 1.73 \tan.$$

$$\theta = \tan + \left(\frac{2.42}{1.73}\right)$$

$$\theta = 54.43$$

$$\theta = 600lb = 200 + 0.866T = 240(0.5$$

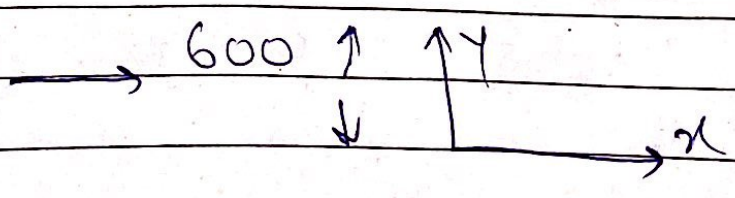
$$(54.43)$$

$$-400lb - 139.6 = 0.866T$$

$$-539.6 = 0.866T.$$

$$\frac{-539.6}{0.866} = T$$

$$T = 623.09lb$$



May be given direction of 600lb is taken in opposite direction.

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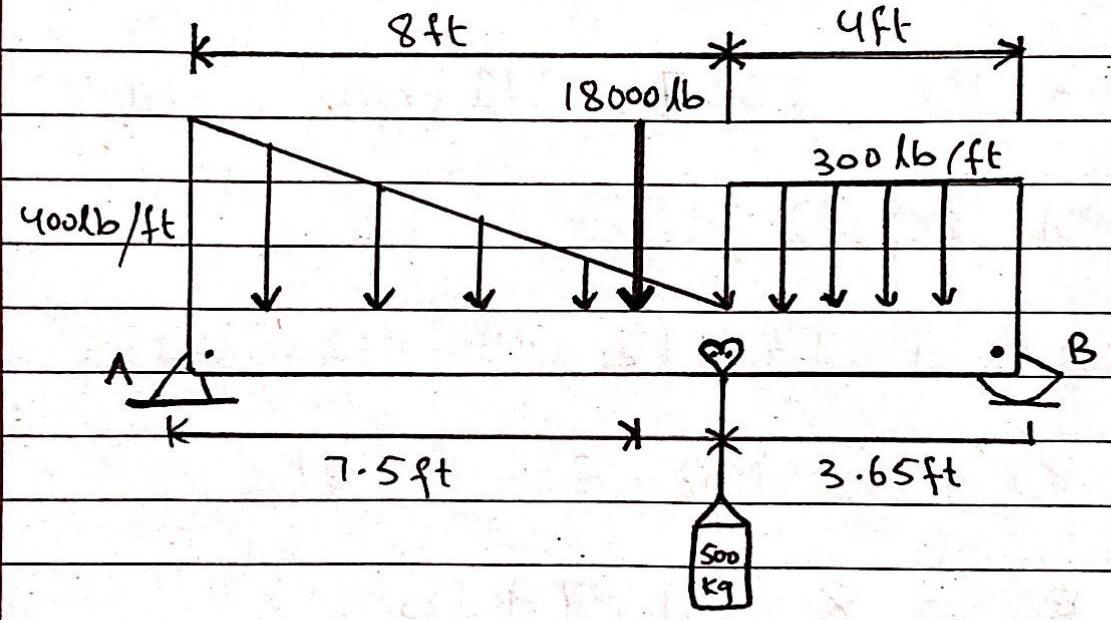
Q3 :- Calculate the reactions at supports.



Solution :-

Since we know that

1 kg = 2.205 lbs.

$\Rightarrow$ 500 kg = 500 × 2.205 = 1102.5 lbs

Now calculate reactions.

$$\Sigma f_y = 0\uparrow + ve.$$

$$R_1 + R_2 = 18000 + 1102.5 + (300 \times 4) + \frac{(400 \times 8)}{2}$$

$$= 21902.5 \text{ lbs}$$

Also:-

$\Sigma M_A = 0$) +ve

$$R_1 \times 0 + (18000 \times 7.5) + 1102.5(8 + 0.35) + (300 \times 4) \times 10 + \left(\frac{400 \times 8}{2} \times \frac{1}{3}(8)\right) = R_2 \times 12$$

$$\Rightarrow 160472.54 = 12 R_2$$

$$\Rightarrow R_2 = \frac{160472.54}{12}$$

$$\Rightarrow R_2 = 13372.71 \text{ lbs.} \quad \text{— eq (2)}$$

Put eq (2) in (1)

$$\Rightarrow R_1 + 13372.71 = 21902.5$$

$$R_1 = 21902.5 - 13372$$

$$R_1 = 8529.79 \text{ lbs.}$$

So that the support Reaction are.

$R_1 = 8529.79$ lbs.
$R_2 = 13372.71$ lbs

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