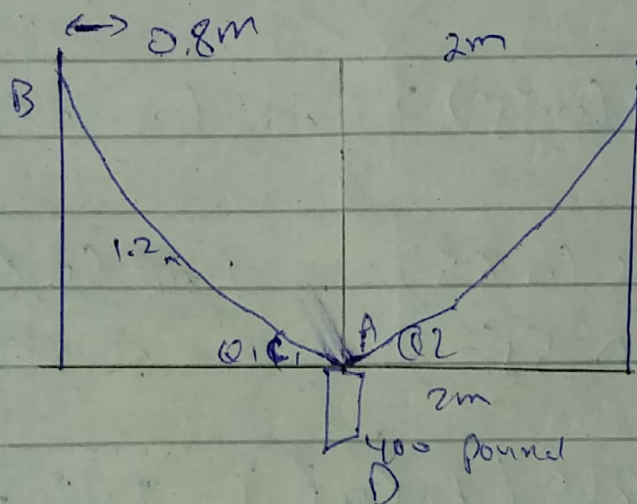


Student ID # 16312

Q:-

Ans:-



$$\tan \theta = \frac{1.2\text{m}}{0.8\text{m}}$$

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

$$\theta = 56.3$$

$$\tan \phi = \frac{1.2}{2\text{m}}$$

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

$$\phi = 30.96$$

$$\sum F_x = 0$$

$$- F_{AB} \cos(56.3) + F_{AC} \cos(30.96) = 0$$

$$\sum F_y = 0$$

$$-1777.2 \text{ N} + F_{AB} \sin(56.3) + F_{AC} \sin(30.96)$$

$$\rightarrow - F_{AB} (0.55) + F_{AC} (0.85) = 0$$

$$= - F_{AB} (0.55) + F_{AC} (0.85) = 0$$

$$= \frac{F_{AC} (0.85)}{0.55} = \frac{F_{AB} (0.55)}{0.55}$$

$$= F_{AC} (1.545) = F_{AB} \rightarrow \text{Q1 eq1}$$

Now

$$= -1777.2 \text{ N} + F_{AB} (0.83) + F_{AC} (0.57) = 0$$

Put eq1's value

$$= -1777.2 \text{ N} + F_{AC} (1.545)(0.55) + F_{AC} (0.57) \\ -1777.2 \text{ N} + F_{AC} (1.28) + F_{AC} (0.57)$$



$$\frac{FAC (1.792)}{1.792} = \frac{1777.2 N}{1.792}$$

$$= FAC = 991.7 N$$

(B) if the volume is increased

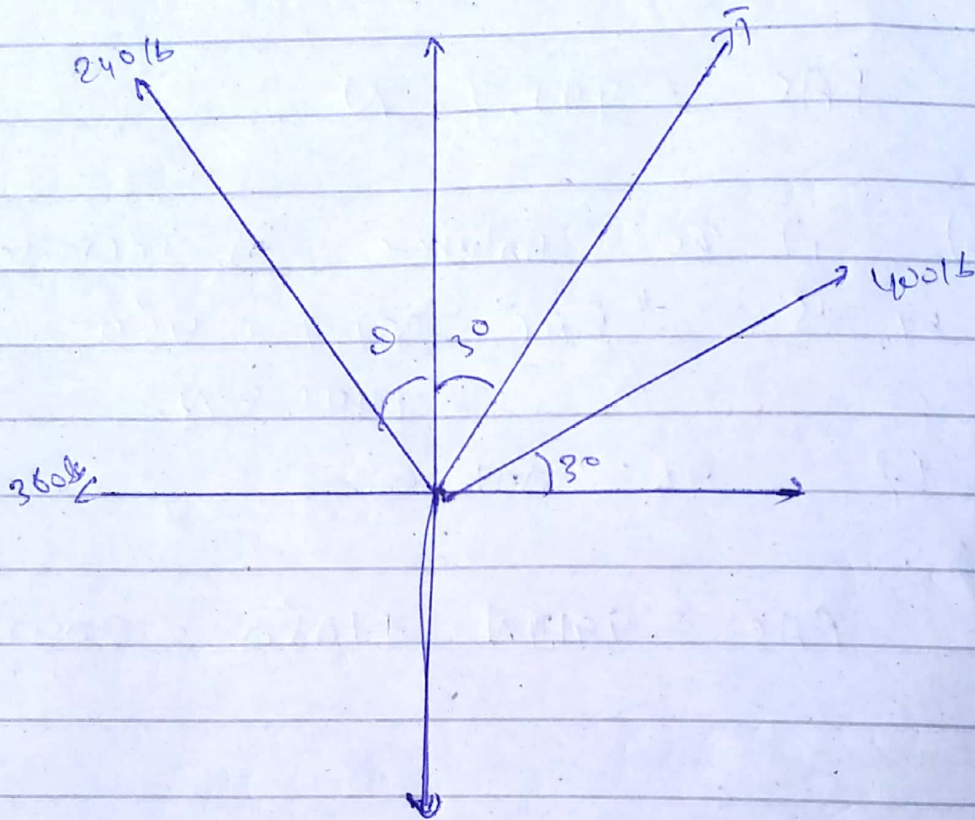
$$\text{by } 15.1 \quad " FAC = 991.7 + 450 \\ = 1441.7 N$$

$$= \text{if } \text{by } 35.1$$

$$= FAC = 991.7 N + 1050 = 2041.7 N$$

Q<sup>2</sup>

Ans:-



$$\Rightarrow \sum F_x = 0$$

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

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

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

$$\Rightarrow -240 \sin \theta + 0.5T = 13.6 \quad \text{--- (i)}$$

$$\sum F_y = 0$$

$$\Rightarrow 240 \cos \theta + T \cos 30 + 400 \sin 30 = 600$$

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

$$\Rightarrow 240 \cos \theta + 86.6T + 200 = 600$$

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

$$\Rightarrow 240 \cos \theta + 0.866T = 400 \quad \text{--- (ii)}$$



$$= 240 \cos \theta + 0.5T = 13.6 \quad (i)$$

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

From the solution of eq(i)  
and eq(ii) we get.

$$(\theta = 21.7)$$

Put  $\theta = 21.7$  in eq(i) we get.

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

$$-88.7 + 0.5T = 13.6$$

$$0.5T = 13.6 + 88.7$$

$$0.5T = 102.3$$

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

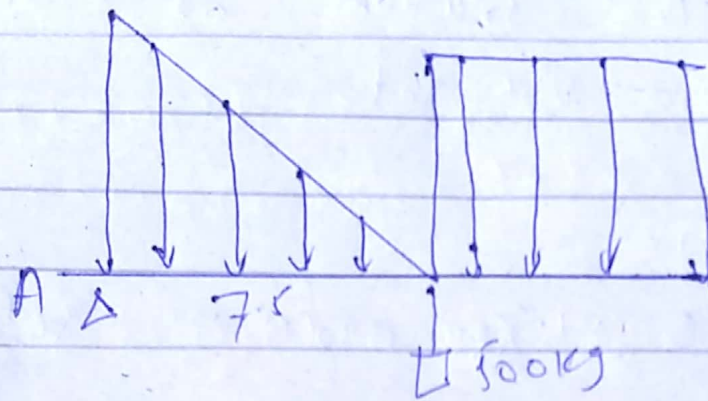
$$T = 204.616 \quad \text{So } \theta = 21.7^\circ$$

$$T = 204.616$$

Ans

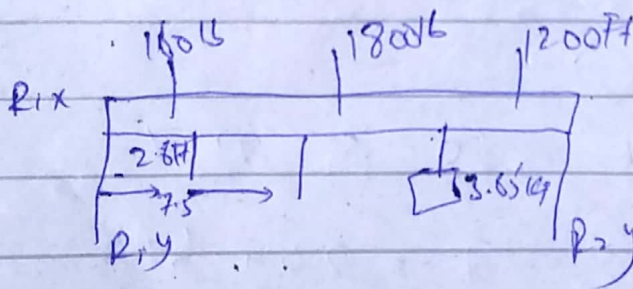
Q:-

Ans:-



= Resultant of UDL =  $300 \text{ lb/ft} \times 4 \text{ ft}$   
 $= 1200 \text{ lb}$

= Resultant of ~~UDL~~ UDL =  $400 \text{ lb/ft} \times 4.8 \text{ ft}$   
 $= 1920 \text{ lb}$



$\leftarrow 8.65 \text{ ft} \rightarrow$

$\leftarrow 12 \text{ ft} \rightarrow$

$\leftarrow 12 \text{ ft} \rightarrow$  total length

$\sum F_x = 0$



$$\sum F_y = 0$$

$$R_{1y} + R_{2y} - 1600 - 1800 - 1500 - 1200 = 0 \quad (1)$$

$$\sum M = 0$$

$$\Rightarrow (R_{2y} \times 12 \text{ Ft}) - (1600 \times 2.6) - (1800 \times 7.5) - (500 \times 8.3) - (1200 \times 10) = 0$$

$$12 R_{2y} - 4160 - 13500 - 4150 - 12000 = 0$$

$$12 R_{2y} = 15530$$

$$R_{2y} = \frac{15530}{12}$$

$$\boxed{R_{2y} = 12942.5 \text{ IB}}$$

Put value of  $R_{2y}$  in eq (1)  
we get

$$\Rightarrow R_{1y} + (12942.5) - 1600 - 1800 - 1500 - 1200 = 0$$

$$\Rightarrow R_{1y} + 12942.5 - 21300 = 0$$

$$\Rightarrow R_{1y} = 8357.5 \text{ IB}$$

$$\boxed{R_{1y} = 8357.5 \text{ IB}} \quad \text{Ans}$$