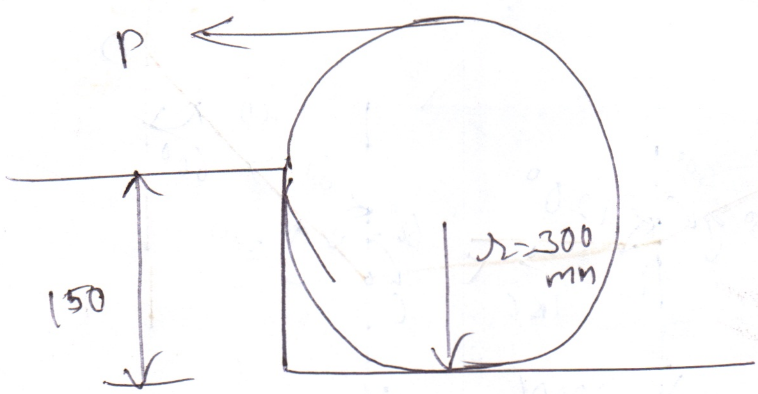
Assignment-2 UNIT-2

(1) (a) Explain Lamis theorem

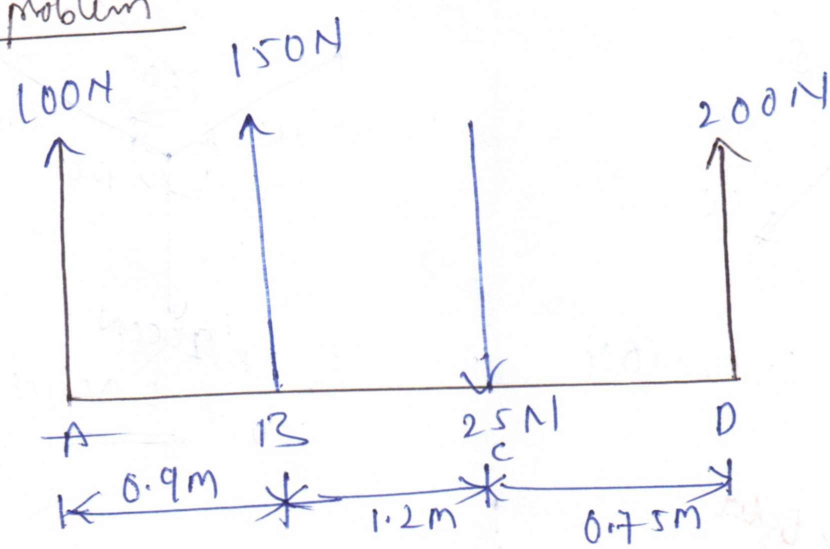
(b) problem NO:- 2

After varignon's theorem

A roller radius r = 300mm & weight 2000N is to be pulled over a curb of height 150mm by a horizontal force 'P' applied to the end of a string wound tightly around the circumference of the roller. Find the magnitude of 'P' required to start the roller move over the curb. what is the least pull 'P' through the centre of the wheel to just turn the roller over the curb?

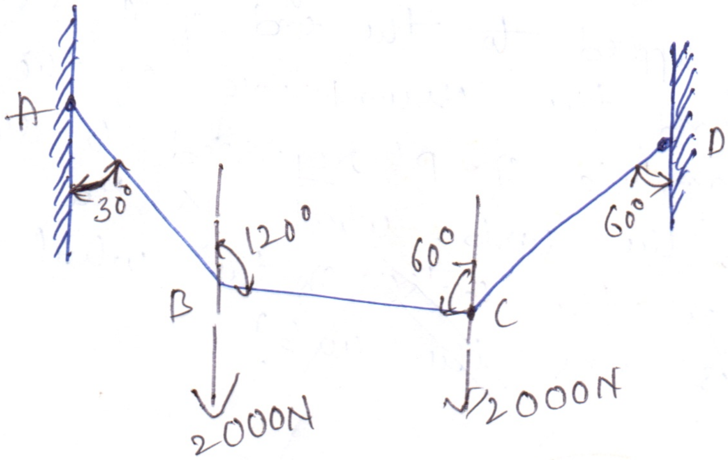


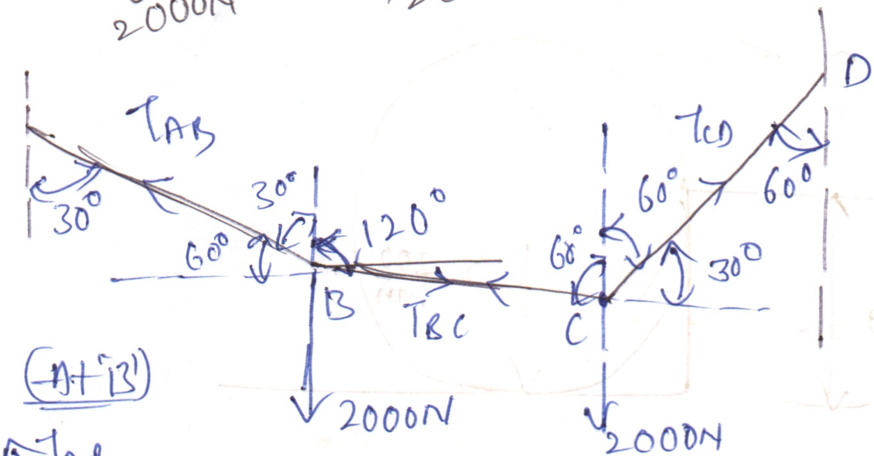
(c) (2)nd problem



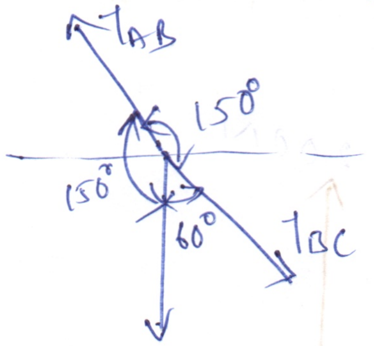
(2) (a) Draw the examples of free body diagram

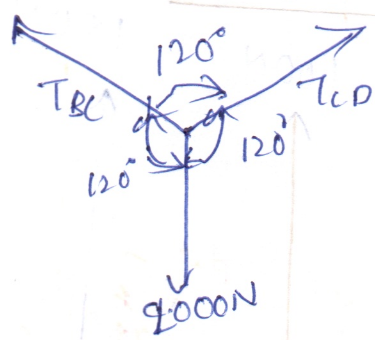
(b) Two equal loads 2000 N are supported by a flexible string ABCD at points B & C. Find the tensions in the position AB, BC & CD of the string





(A+B)

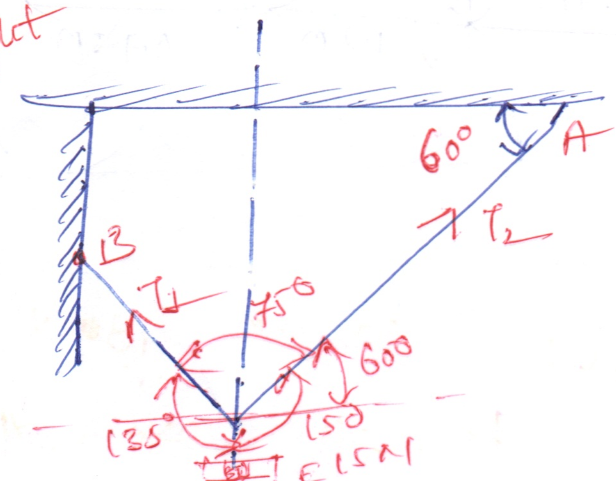




$T_{AB} = 3464.10N$

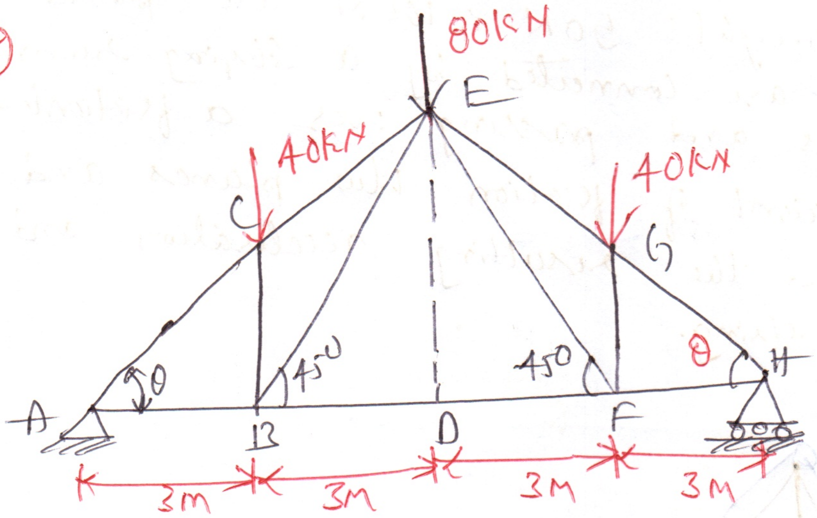
$T_{CD} = \underline{2000N}$

(c) Electric light



(3)(a) Define truss & Examples
(b) Types of Trusses & their Assumption of perfect truss
(c)

Ex 14
136&137



Assignment-3 unit-3

(3)(a) Difference b/w centroid & Centre of gravity
(b) Centroids of some standard figures
(c) Find the centroids of the following figures from the given 'X' & 'Y' axes

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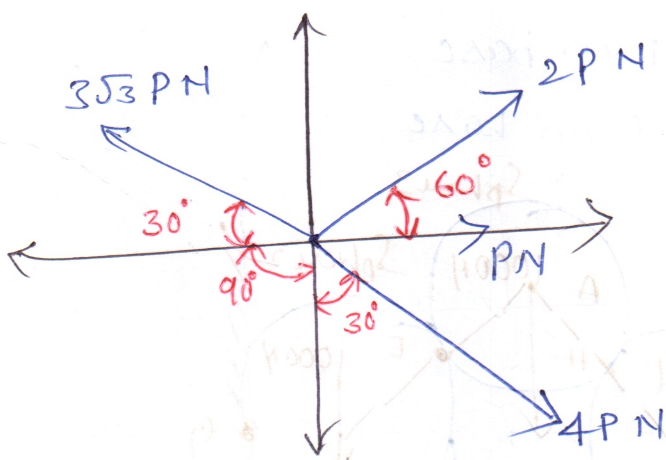
MID Questions

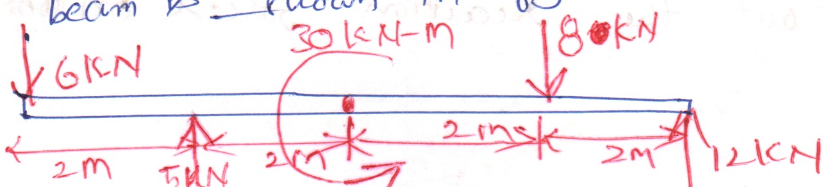
1) (a) Find the magnitude & direction of resultant of concurrent forces as shown in figure are



(b) (a) Varignon's theorem (or) principle of moments, Then apply these theorem in these problem

P34

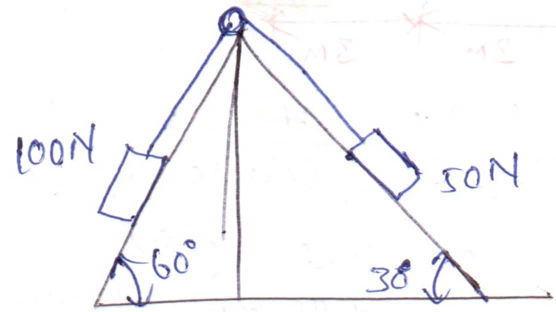
Determine and locate the Resultant 'R' of the forces and one couple is acting on the beam is shown in figure



⑥ The rough planes inclined at 30° & 60° to horizontal are placed back to back as shown in figure. The blocks of weights 50N & 100 N are placed on the faces and are connected by a string running parallel to planes and passing over a frictionless pulley. If the coefficient of friction b/w planes and blocks is 1/3 Find the resulting acceleration and tension in the string.

Friction

ACE



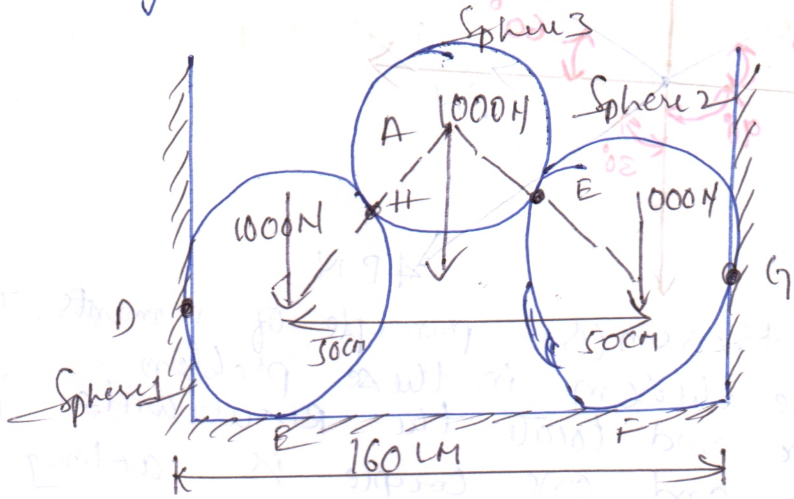
(a) Draw the FBD in below ~~figure~~ problem

② (a) Three spheres weighing 1000 N each & 60 cm in diameter are placed in a channel of 160 cm wide as shown in figure. Determine the presses exerted by

(83) (i) The cylinder 'A' on 'B'

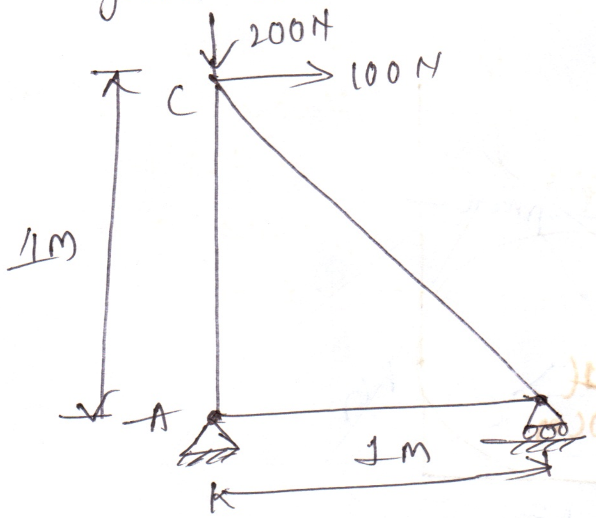
(ii) The cylinder B on base

(iii) The cylinder 'C' on base



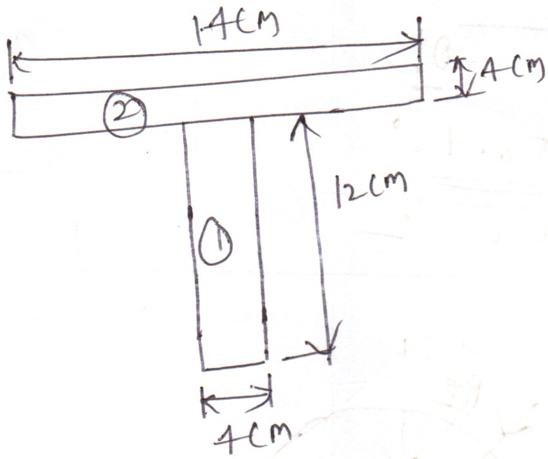
(b) Find out the reaction forces on above problem 2(a)
NO: 2 (a)

(c) Find the forces in the members of the given truss



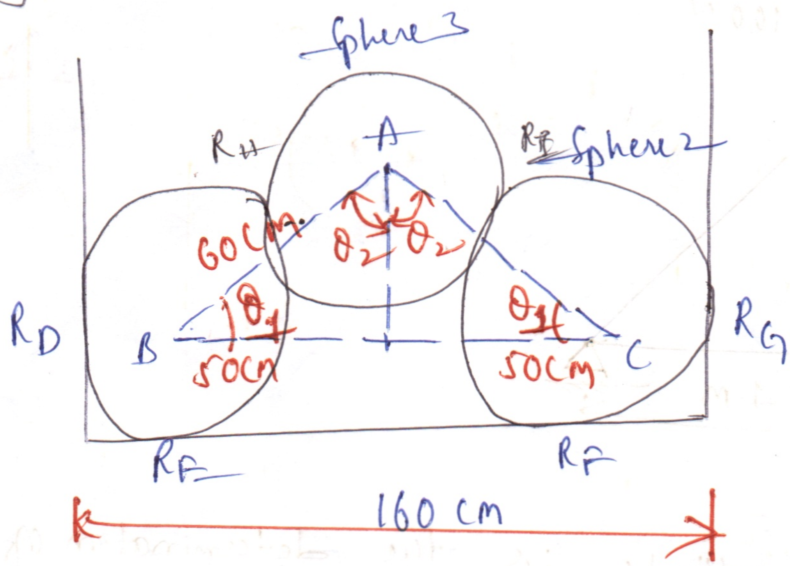
(1) (a) Explaining methods for the determination of centroid.

2016 (b) Determine the centroid of the following T-section



(C) Explain the two theorems of pappus.

2(a) Ans FBD of the given system is shown in below fig



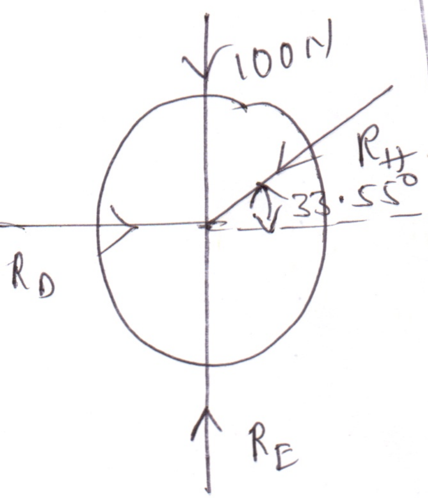
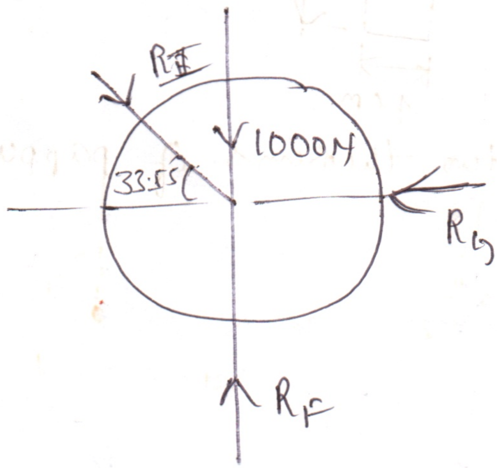
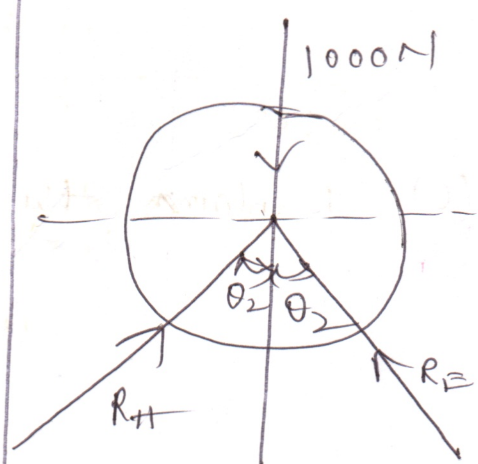
From the above FBD

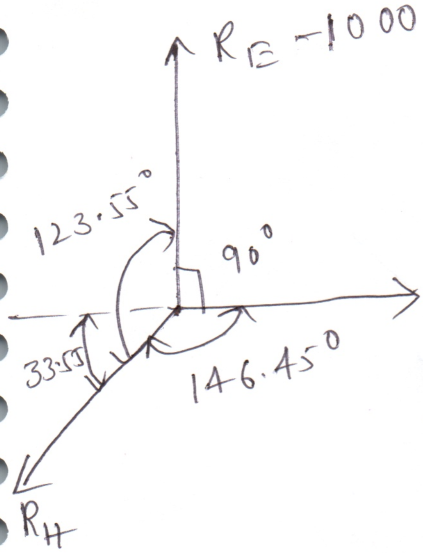
$$\cos\theta_1 = \frac{50}{60} \Rightarrow \theta_1 = \cos^{-1}\left(\frac{50}{60}\right)$$

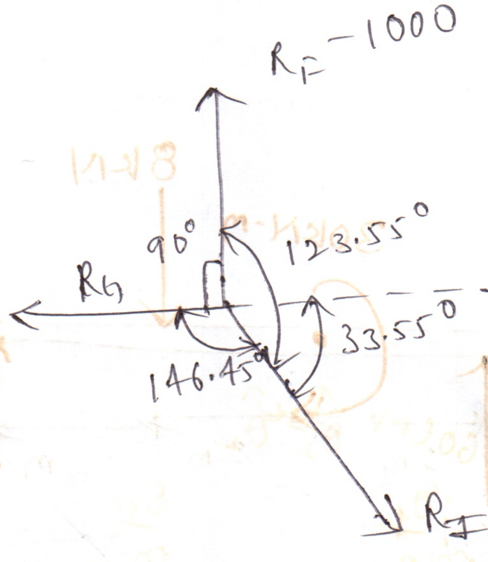
$$\theta_1 = 33.55$$

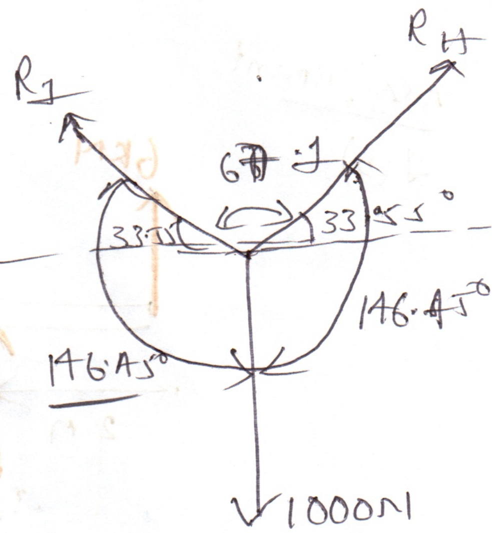
$$\theta_2 = 90 - \theta_1$$

$$\theta_2 = 56.45^\circ$$

Sphere 1	Sphere : 2	Sphere 3
		







$$\frac{R_E - 1000}{\sin(146.45)} = \frac{R_H}{\sin 90^\circ} = \frac{R_D}{\sin(123.55)}$$

$$\frac{R_D}{\sin(123.55)} = \frac{599.94}{1}$$

$$R_D = 599.94 \times \sin(123.55)$$

$$R_D = 499.99\ N$$

$$\frac{R_E - 1000}{\sin(146.45)} = \frac{599.94}{1}$$

$$R_E = 1331.56\ N$$

$$\frac{R_F - 1000}{\sin(146.45)} = \frac{R_I}{\sin 90^\circ} = \frac{R_G}{\sin(123.55)}$$

$$\frac{R_G}{\sin(123.55)} = \frac{599.94}{1}$$

$$R_G = 599.94 \times \sin(123.55)$$

$$R_G = 499.9\ N$$

$$\frac{R_F - 1000}{\sin(146.45)} = 599.54$$

$$R_F - 1000 = 331.56$$

$$= 1331.56$$

$$\frac{R_I}{\sin(146.45)} = \frac{R_H}{\sin(146.4}$$

$$= \frac{1000}{\sin 67.1}$$

$$R_I = \frac{1000 \times \sin(146.45)}{\sin(67.1)}$$

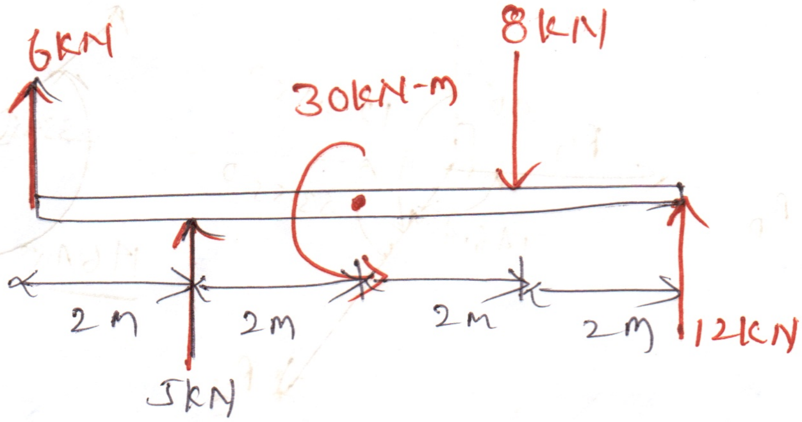
$$R_I = 599.94\ N$$

$$R_H = \frac{1000 \times \sin(146.45)}{\sin(67.1)}$$

$$R_H = 599.94\ N$$

Assignment

1(b)



Ans:

$\Sigma f_x = 0$

$\Sigma F_y = 6+5-8+12 = 15\,kN$

$R = \sqrt{\Sigma F_x^2 + \Sigma F_y^2} = \sqrt{0^2 + 15^2}$

$R = 15\,kN$

Varignon's

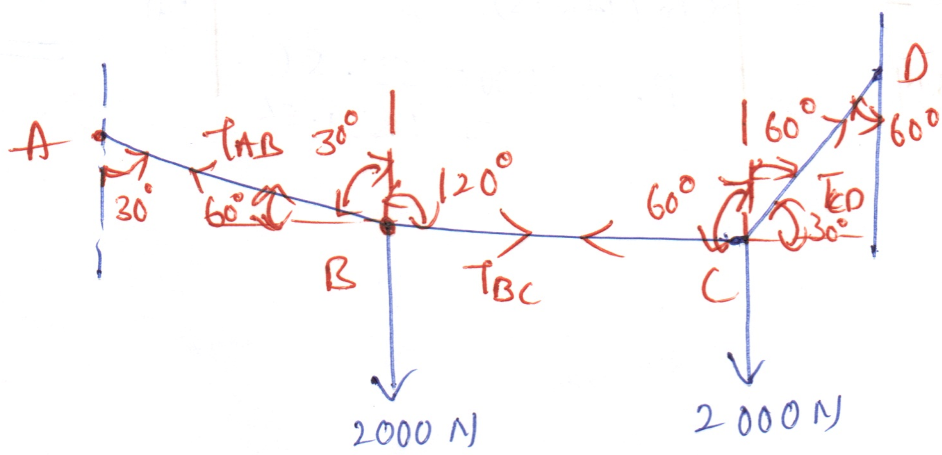
$\Rightarrow$ $R \times d = (F_1 \times d_1) + (F_2 \times d_2) + (F_3 \times d_3) - - -$

$15 \times x = (6 \times 0) + (5 \times 2) + (-8 \times 6) + (12 \times 8) + 30$

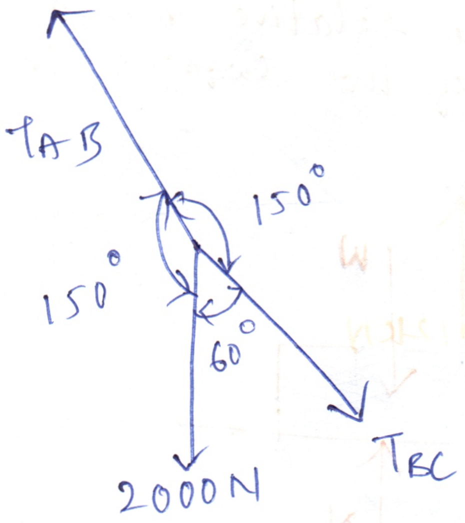
$x = 5.86\,m$

$R = 15\,kN$ at $5.86\,m$ ✓

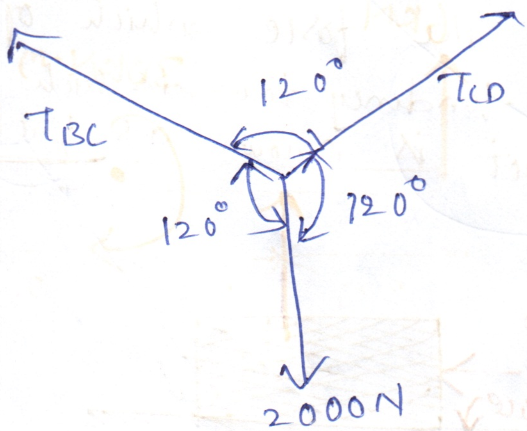
2(b)



At 'B'



At 'C'



$$\Rightarrow \frac{2000N}{\sin 150^\circ} = \frac{T_{BC}}{\sin 150^\circ} = \frac{T_{AB}}{\sin 60^\circ}$$

$T_{BC} = 2000N$

$T_{AB} = 3464.10N$

$$\Rightarrow \frac{2000N}{\sin 120^\circ} = \frac{T_{BC}}{\sin 120^\circ} = \frac{T_{CD}}{\sin 120^\circ}$$

$T_{BC} = 2000N$

$T_{CD} = 2000N$