

1.-  $\vec{T}_{AB} = \frac{210}{7} (3\hat{i} - 6\hat{j} - 2\hat{k}) [N]$

$\vec{T}_{AC} = \frac{245}{7} (2\hat{i} - 3\hat{j} - 6\hat{k}) [N]$

$\vec{R} = \vec{T}_{AB} + \vec{T}_{AC}$

$\vec{R} = 160\hat{i} - 285\hat{j} - 270\hat{k} [N]$

$\cos \theta = \frac{\vec{T}_{AB} \cdot \vec{T}_{AC}}{|\vec{T}_{AB}| |\vec{T}_{AC}|} ; \theta = 42.72^\circ$

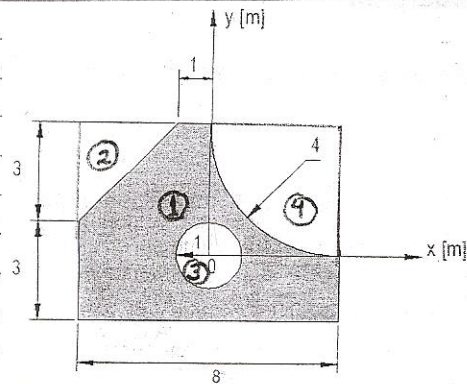
2.-  $\vec{R} = -600\hat{k} [N]$

$\vec{M}_{par} = 54\hat{i} [N \cdot m]$

$\sum \vec{M}_c = [54 - d(600)]\hat{i} = 0$

$d = 0.09 m$

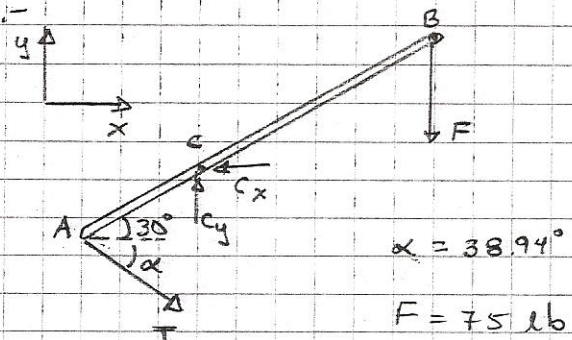
3.-



	$\bar{x}_i$ [m]	$\bar{y}_i$ [m]	$A_i$ [m <sup>2</sup> ]	$\bar{x}_i A_i$ [m <sup>3</sup> ]	$\bar{y}_i A_i$ [m <sup>3</sup> ]
①	0	1	4.8	0	4.8
②	-3	3	-4.50	13.50	-13.50
③	0	0	-3.14	0	0
④	2.30	2.30	-12.57	-28.93	-28.93
$\Sigma$			27.79	-15.43	5.57

$\bar{x} = -0.56 m$        $\bar{y} = 0.20 m$

4.-



$\sum F_x = T \cos \alpha - C_x = 0$

$\sum F_y = -T \sin \alpha + C_y - F = 0$

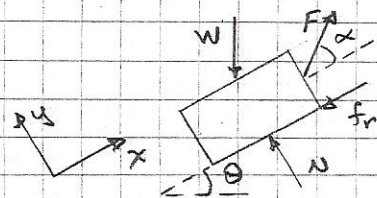
$\sum M_c = -15\left(\frac{\sqrt{3}}{2}\right)F + 5T \cos \alpha + 10\left(\frac{\sqrt{3}}{2}\right)T \sin \alpha = 0$

$T = \frac{3.5\sqrt{3} F}{5(\cos \alpha + \sqrt{3} \sin \alpha)} ; T = 104.40 N$

$C_x = 81.20 N ; C_y = 140.62 N$

$C = 162.38 N$

5.-



$\sum F_x = F \cos \alpha - W \sin \theta - f_r = 0$

$\sum F_y = N + F \sin \alpha - W \cos \theta = 0$

$f_r = \mu_s N ; N = W \cos \theta - F \sin \alpha$

$F = \frac{W (\sin \theta + \mu_s \cos \theta)}{\cos \alpha + \mu_s \sin \alpha}$

$W = 10 N, \theta = 30^\circ, \alpha = 15^\circ, \mu_s = 0.3$

$F = 7.28 N$