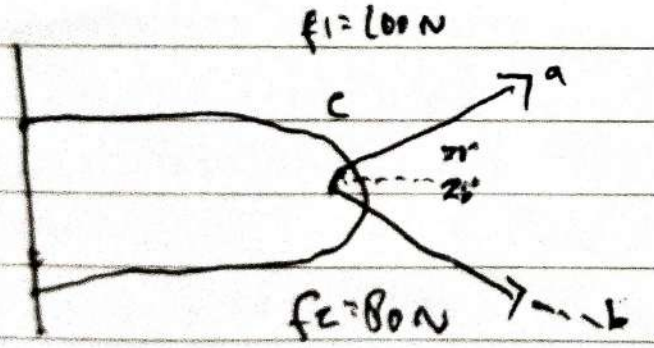
UNIVERSITAS MAYASARI BAKTI
Program Studi TEKNIK MESIN

Ujian Tengah Semester
Tahun Ajaran 2023/2024

Nama : Faris Risky
Matakuliah : Mechanics Engineering Material
Nama Dosen : Widianto, S.T., M.T.
tgl : Senin, 13 November 2023

1 Determine R and fb ?

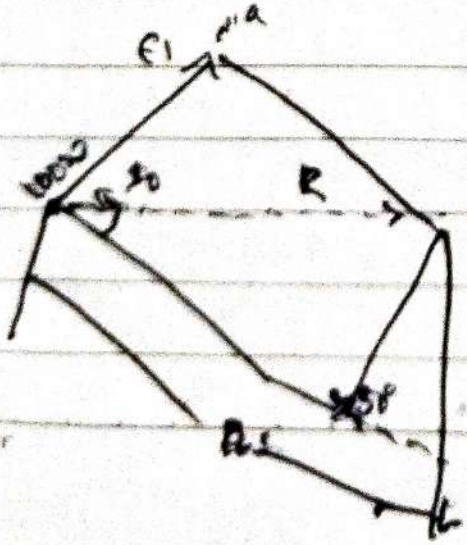


$R^2 = f_1^2 + f_2^2 - 2 \times f_1 \times F_2 \times \cos 130^\circ$

$R^2 = (80)^2 + (100)^2 - 2 \times (4) \times \cos$

$R^2 = 26699.56$

$R = 163.4\ N$



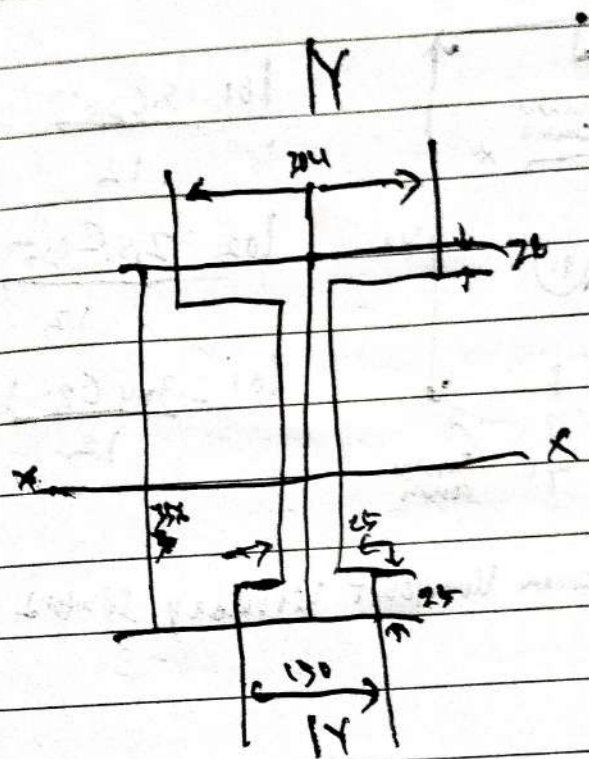
the figure also show the orthogonal projection fb or R also the b-axis its length is

$F_b = 80 + 100 \cos 50 = 144.3\ N$

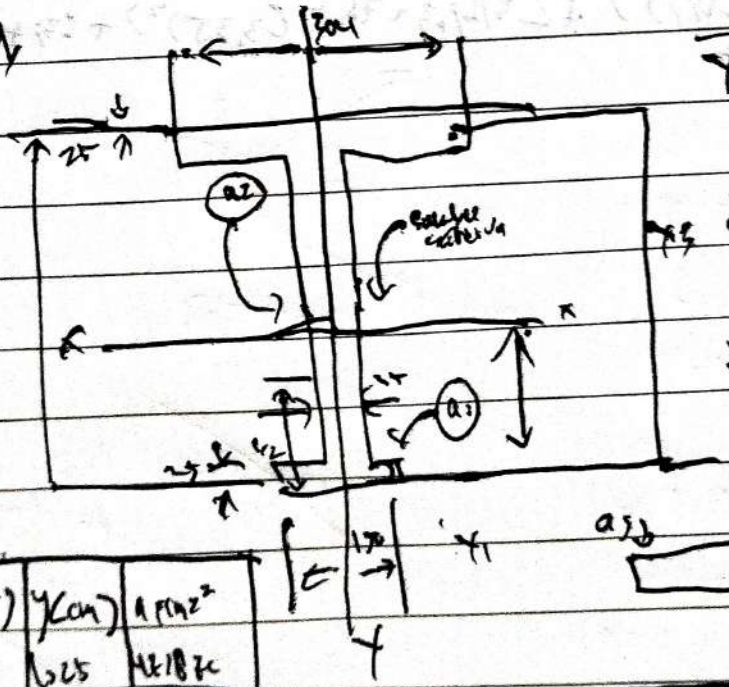
No.:

Date:

2. Hitung momen inersia terhadap sumbu sentroid x-x dan Y-Y suatu luasan komposit sebagaimana diperlihatkan pada di bawah ini.



Jawab



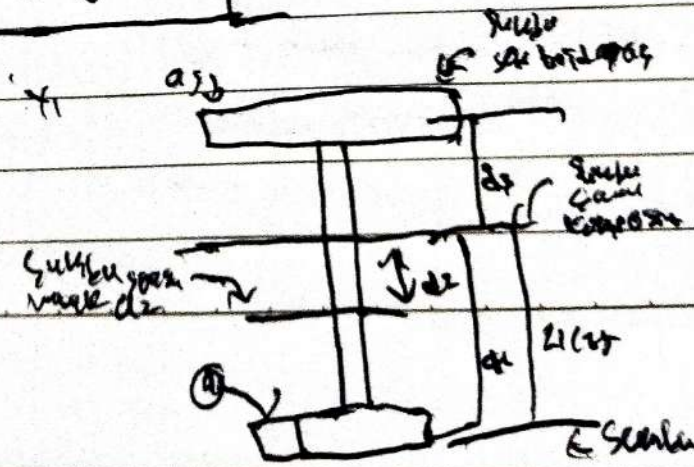
Bidang Komposit	a (cm^2)	y (cm)	a.y (cm^3)
a_1	32,5	1,25	40,625
a_2	85	17,5	1487,5
a_3	26	34,35	892,1
Σ	190		4049,125

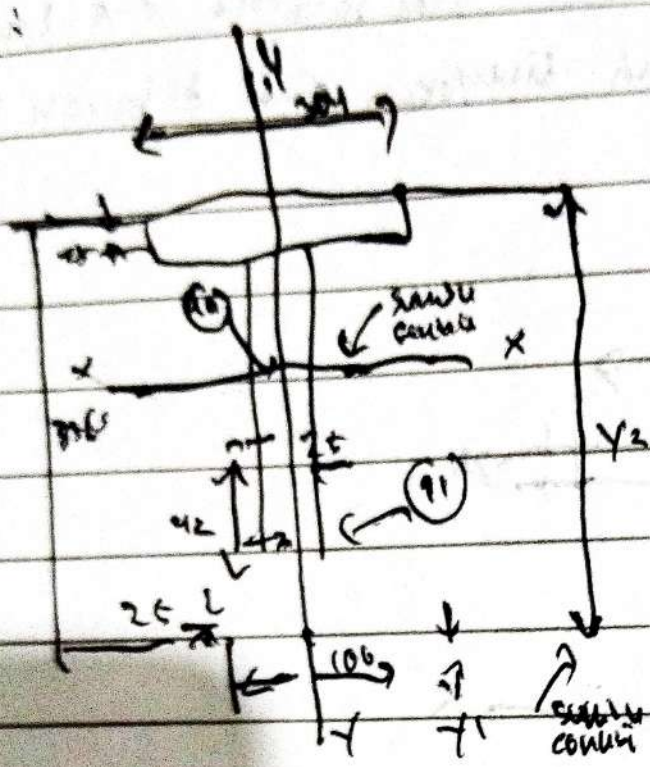
$$\bar{Y} = \frac{\Sigma a.y}{\Sigma a} = \frac{4049,125}{190} = 21,15 \text{ cm}$$

$d_1 = 21,15 - 1,25 = 19,9$ cm

$d_2 = 21,15 - 17,5 = 3,65$ cm

$d_3 = 34,35 - 21,15 = 13,2$ cm





$I_{01} = \frac{15.(2,5^3)}{12} = 19,53\ cm$

$I_{02} = \frac{2,5.(40,5^3)}{12} = 1382,30\ cm$

$I_{03} = \frac{30,4\ (2,54)}{12} = 32,58\ cm$

Maka momen inersia dari luasan komposit terhadap sumbu x-x adalah:

$I_x = \Sigma (I_0 + a_1^2)$

$I_x = (19,5 + 37,5(19,7^2)) + (5969,3 + 76,5\ (3,35)^2) + (32 + 58 + 76\ (6,5)^2)$

$= 34179,34\ cm^2$

No.: Date:

3 Gambarkan kurva uji tarik baja karbon

Stress - Strain Diagram : Ductile Materials