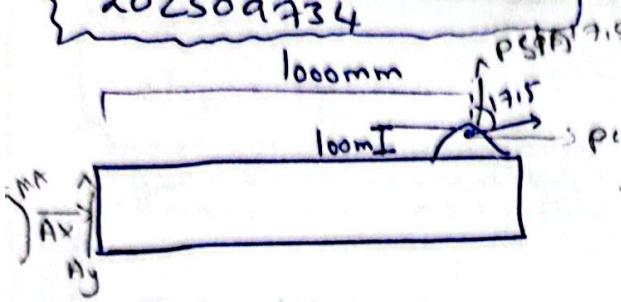
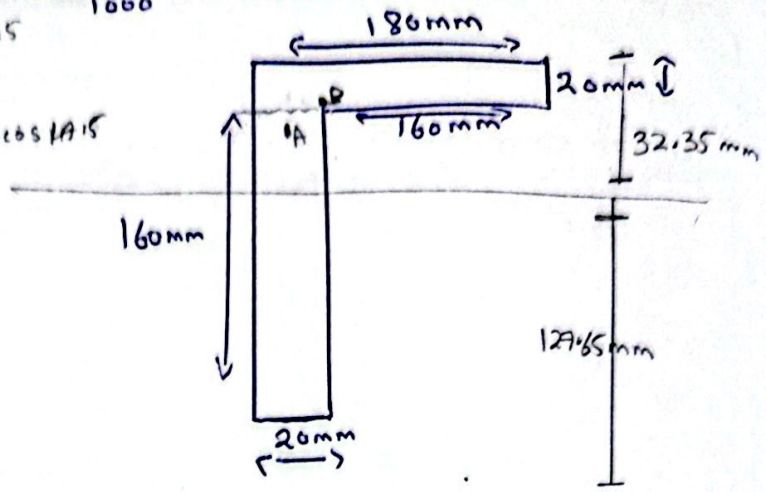
{ mahdi hussain alhalwachi
202309734

$P = \frac{9734}{1000} = 9.734\ kN$





$\Sigma F_x = 0$

$Ax + 97.34\cos 17.5 = 0$

$Ax = -92.83$

$\Sigma F_y = 0$

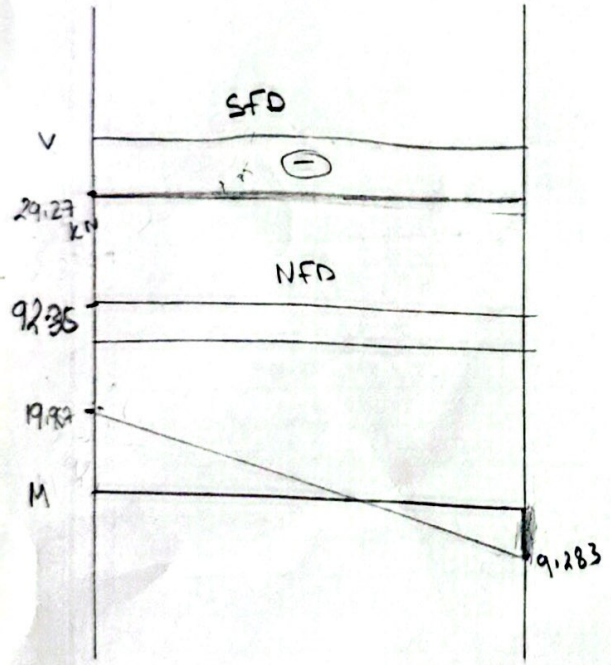
$Ay + 97.34 \sin 17.5 = 0$

$Ay = -29.27$

$\Sigma M_A = 0$

$\Sigma M_A + 97.34\sin 17.5 * 1000 - 97.34\cos 17.5 * 100 = 0$

$MA = -19.987$



$\bar{y} = \frac{(180\times20)(170)+(160\times20)(80)}{(180\times20)+(160\times20)}$

$= 127.65\ mm$

$I_x = \frac{1}{12} * 180 \times 20^3 + 180 \times 20 (\ldots$

$+ \frac{1}{12} 20 \times 160^3 + (80 - 127.65)^2 \times 20 \times 160$

$I_x \approx 20669019.67\ mm^4$

$\tau = \frac{VQ}{It}$ $Q = (20\times180)(42.35)$

$+ (32.35 \times 20)(16.175$

$= 162925.225$

$t = 20mm$

$= \frac{29.27 * 10^3 * Q}{I * 20}$

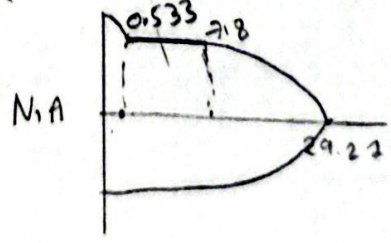
$\tau = 11.536\ Mpa$

$\tau_B = \frac{(29.27\times10^3) * (20\times80\times42.35)}{I_x \times 180}$

$= 0.533\ Mpa$

$\tau_A = \frac{(29.27\times10^3) * (20\times180\times42.35)}{I \times 20}$

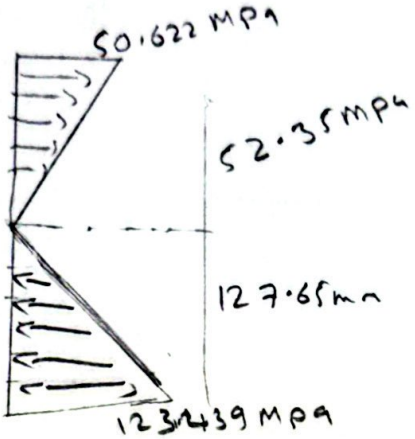
$= 4.797\ Mpa$



$$\sigma_{max} = \frac{M \cdot c}{I}$$

$$\sigma_{max} = \frac{19.987 \times 10^3 * (127.65)}{I} = 123.439 \text{ MPa} [C]$$

$$\sigma_t = \frac{19.98 \times 10^3 * (180 - 127.65)}{I} = 50.622 \text{ MPa} [T]$$



$$\sigma_n = \frac{92.35 \times 10^3}{6800} = 13.5808 \text{ MPa} [T]$$