MCTA 2332 Quiz 2 Solution

E.g. matric number: 2134567, P = 4kN,

T = 6kN.m.

outer diameter = 4cm, inner diameter = 3cm.

a) Fig 1 → $\sigma = \frac{P}{A}$

$$\sigma = \frac{4 \times 10^3}{\pi\left(\frac{0.04}{2}\right)^2 - \pi\left(\frac{0.03}{2}\right)^2}$$

$$= 7.28 \text{MPa}.$$

b) Fig 2, $\tau = \frac{Tc}{J}$

$$J = \frac{\pi}{2}\left(c_o^4 - c_i^4\right)$$

$$= \frac{\pi}{2}\left(0.02^4 - 0.015^4\right)$$

$$= 1.72 \times 10^{-7} \text{ m}^4$$

or From Table A-18,

$$J = \frac{\pi}{32}\left(0.04^4 - 0.03^4\right)$$

$$= 1.72 \times 10^{-7} \text{ m}^4$$

$$\tau_{max} = \frac{6000\,(0.02)}{1.72 \times 10^{-7}}$$

$$= 697.67 \text{MPa}$$

$$\tau_{min} = \frac{6000\,(0.015)}{1.72 \times 10^{-7}}$$

$$= 523.26 \text{MPa}.$$

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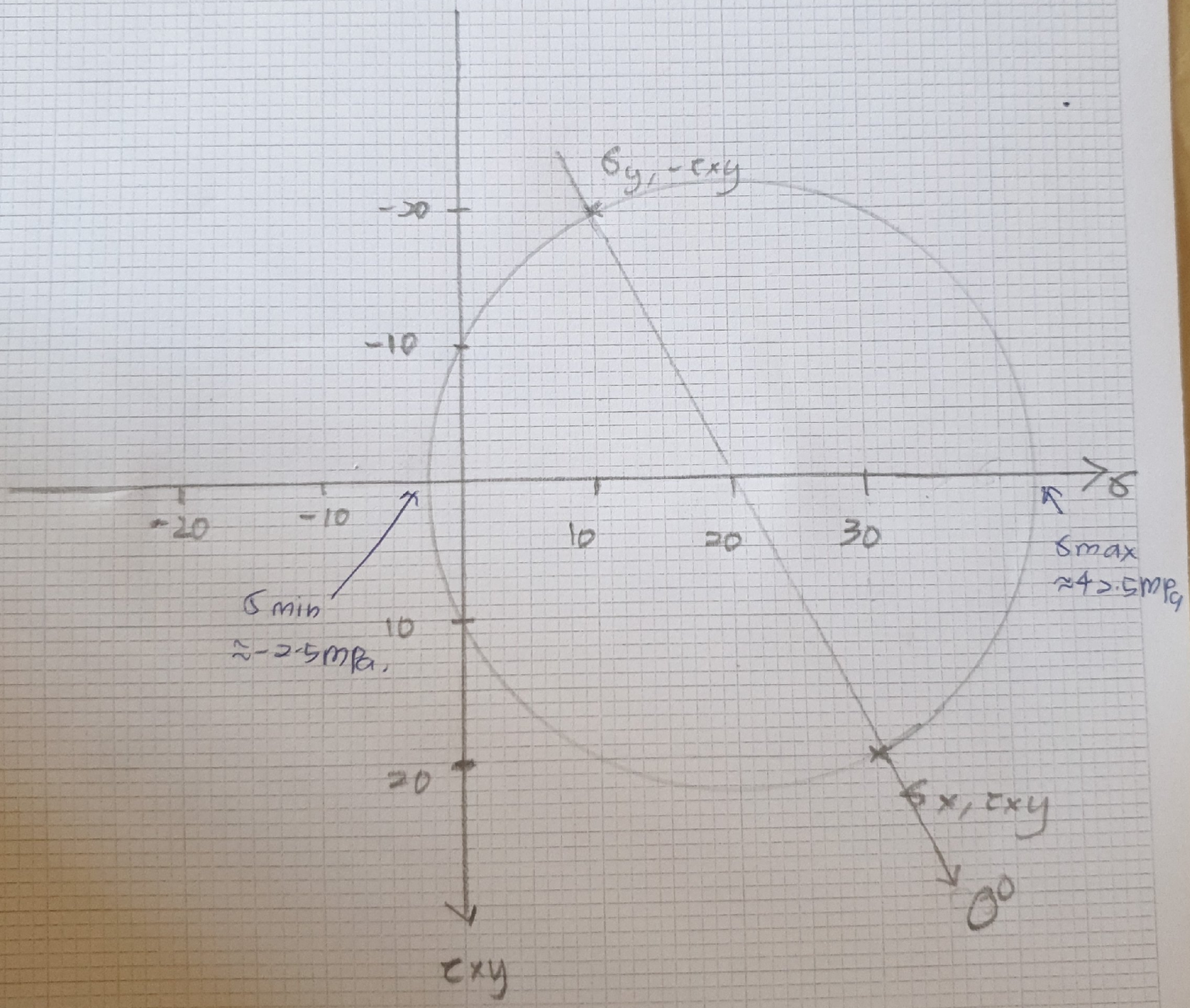
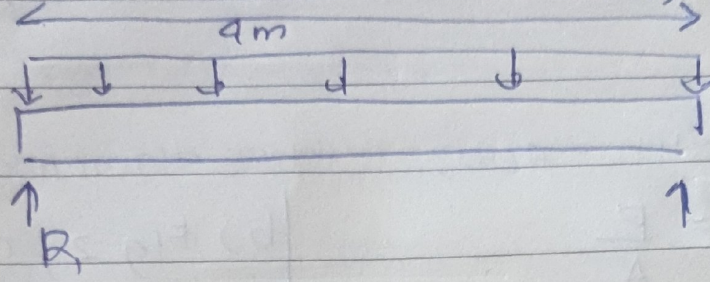
= 30 MPa, σ_y = 10 MPa, τ_{xy} = 20



MCTA 2332.

DATE: Quiz 3 Solution

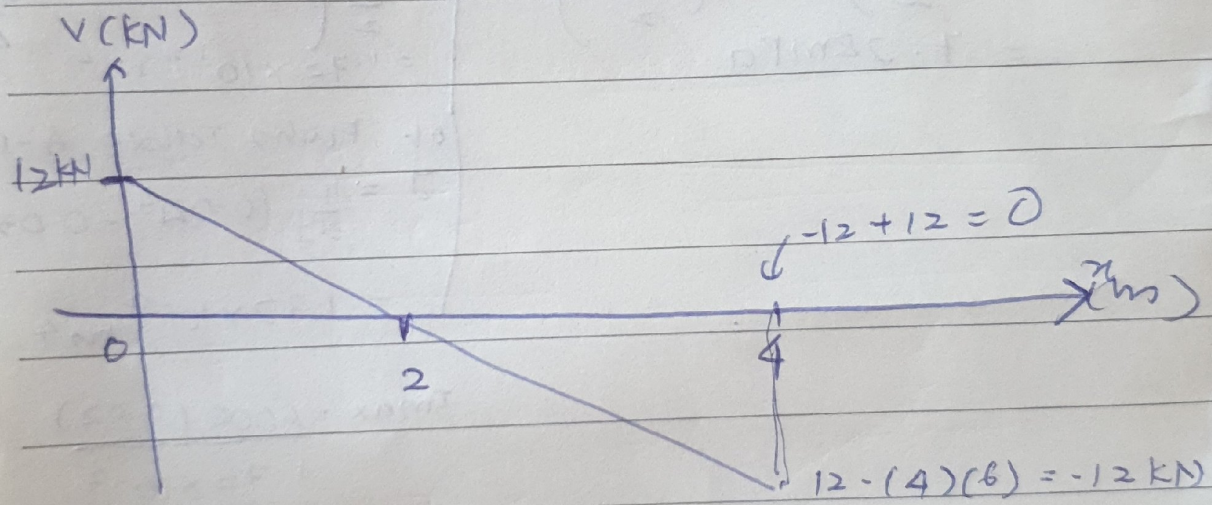
1. E.g. matric number = 213456 7, L=4m, w=6kN/m

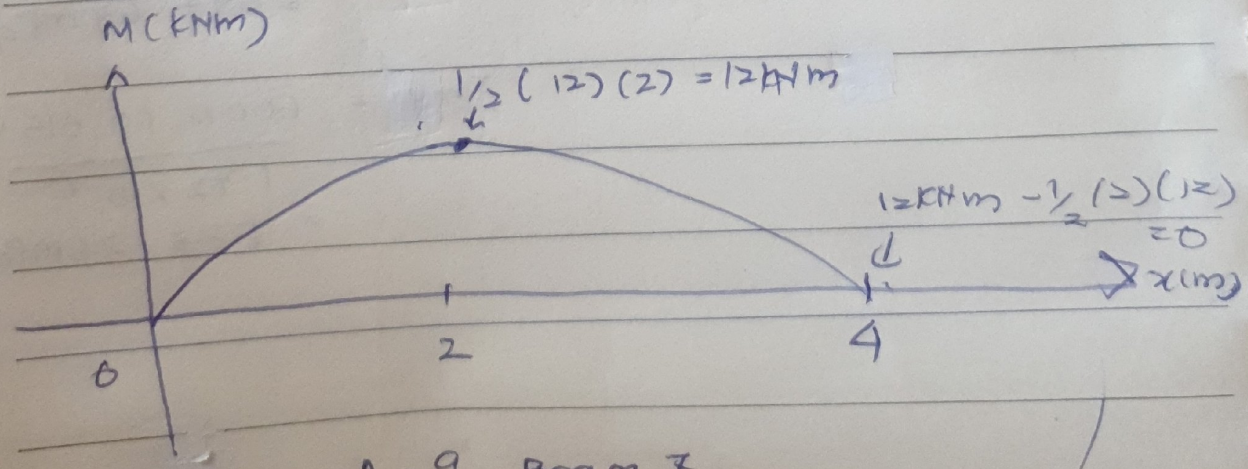


$+\uparrow \Sigma F_y = 0$, $R_1 + R_2 - 6(4) = 0$.

$+\circlearrowleft \Sigma M = 0$, $6(4)(2) - R_2(4) = 0$.

$R_2 = 12\,kN$, $R_1 = 12\,kN$.





2. From Table A-9, Beam 7.

$y = \frac{wx}{24EI}(2Lx^2 - x^3 - L^3) = \frac{6x}{24EI}(8x^2 - x^3 - 64)$