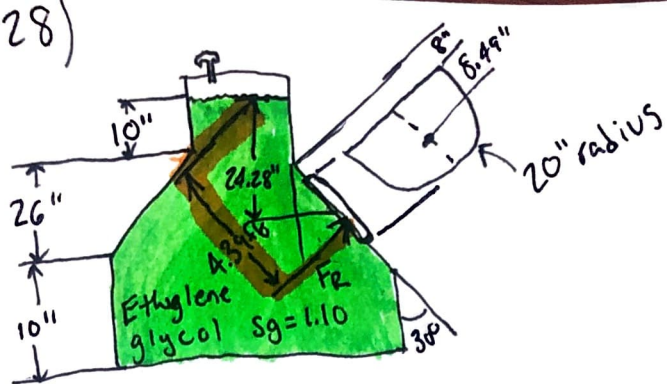


4.28)



$$sg = 1.10$$

$$\gamma_{eg} = 1.10 (62.4) = 68.64 \text{ lb/ft}^3$$

Robert Knupp
MET 330
HW 2.1
Group 2

$$\text{Centroid} = \frac{4r}{3\pi} = \frac{4(20)}{3\pi} = 8.49 \text{ in}$$

$$A = \frac{\pi r^2}{2} = \frac{\pi 20^2}{2} = 628.32 \text{ in}^2 = 4.36 \text{ ft}^2$$

$$\therefore h_c = 10 + (8 + 8.49) \cos 30$$

$$h_c = 24.28 \text{ in} = 2.02 \text{ ft}$$

$$F_R = \gamma_{eg} h_c A = 68.64 (2.02) (4.36) = 604.53 \text{ lb}$$

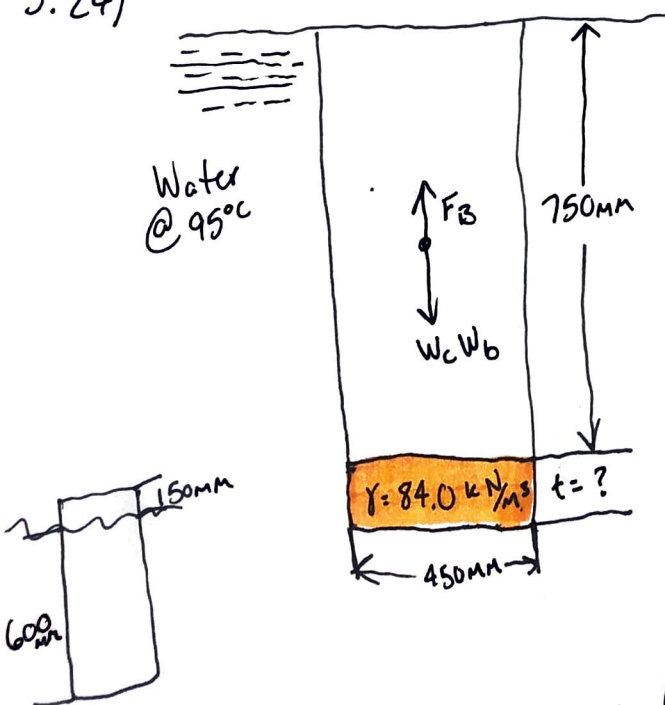
$$\therefore L_c = \frac{h_c}{\sin 30}$$

$$I_c = \frac{\pi r^4}{4} = \frac{\pi 20^4}{4} = 125,663.71 \text{ in}^4 = 6.06 \text{ ft}^4$$

$$L_c = 48.56 \text{ in} = 4.05 \text{ ft}$$

$$\therefore L_p = L_c + \frac{I_c}{L_c A} = 4.05 + \frac{6.06}{(4.05)(4.36)} = 4.39 \text{ ft} = 52.72 \text{ in}$$

5.24)



$$\gamma_w = 9.44 \text{ kN/m}^3$$

$$\rho_w = 962 \text{ kg/m}^3$$

$$\Sigma F = F_B - W_c - W_b$$

$$\therefore \gamma_f V_T = \gamma_c V_c + \gamma_b V_b$$

$$9.44 \text{ kN/m}^3 (.119 + .159t) = 6.456 (.119) + 84 (.159t)$$

$$(1.12336 + 1.501t) = .768 + 13.356t$$

$$\therefore 11.855t = .35536$$

$$\therefore t = 0.03 \text{ m or } 30 \text{ mm}$$

$$\gamma_{\text{cylinder}} = \gamma_{\text{kero}} \left(\frac{V_{\text{kero}}}{V_{\text{cylinder}}} \right) = 8.07 \text{ kN/m}^3 \left(\frac{\frac{\pi (.45)^2}{4} \times .6}{\frac{\pi (.45)^2}{4} \times 0.75} \right) = 6.456 \text{ kN/m}^3$$

$$V_{\text{cylinder}} = \pi (.225)^2 \times .76 \text{ m} = .119 \text{ m}^3$$

$$V_T = (.119 + .159t)$$

$$V_{\text{brass}} = \pi (.225)^2 \times t = .159t \text{ m}^3$$