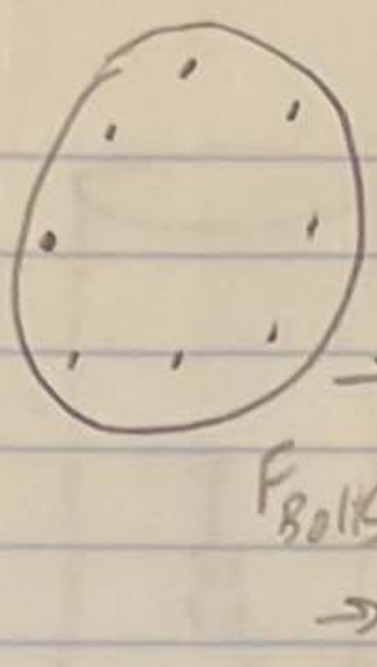
HW 3

Logan Koob
5/30

4.2

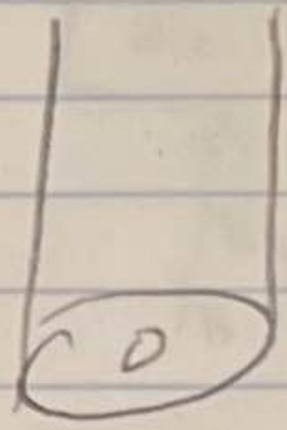


30in Dia
8 Bolts

$F = P \cdot A \quad F = 14.41 \frac{lb}{in^2} \cdot \frac{\pi}{4} 30in^2$

$\boxed{F = 10,178.76lb}$ or 1272.35 lb per bolt

4.10



$h = 1.8m$

$A = \frac{\pi}{4} \cdot .095m^2$

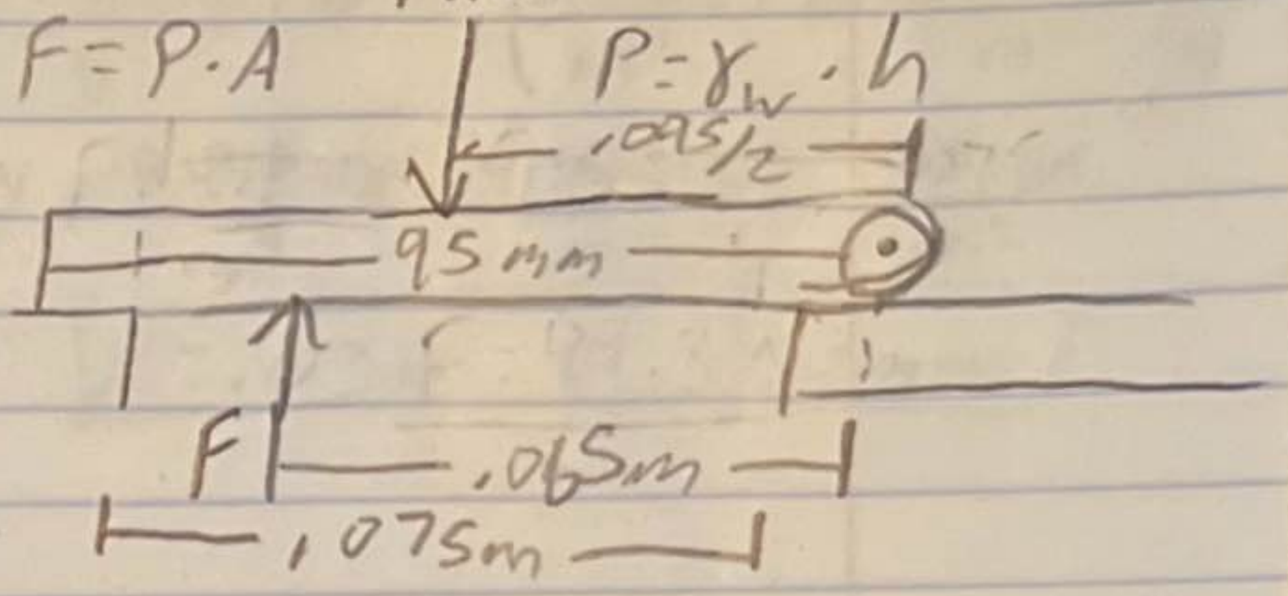
$\gamma_w = 9.81 kN/m^3$

$F_w = \gamma_w \cdot h \cdot A_{valve}$

$F_w = \frac{9.81kN}{m^3} \cdot 1.8m \cdot \pi \cdot \frac{.095m^2}{4}$

F_{water}

$F = P \cdot A \quad P = \gamma_w \cdot h$



$F_w = .125KN$

$\Sigma M_{Hinge} = 0 = (F \cdot .065mm) - (F_w \cdot \frac{.095}{2})$

$F = \frac{.125kN \cdot .0475m}{.065m}$

$\boxed{F = 91.3N}$

5.8

$Sg_{oil} = .9$
$p_{ump} = 14.61bs$
$V_{Body} = 40in^3$

$F_b = \gamma_{oil} \times V_{Body}$

$F_b = 56.16 \frac{lb}{Ft^3} \times 40in^3$

$\gamma_{oil} = 62.4 \frac{lb}{Ft^3} \cdot .9$

$\gamma_{oil} = 56.16 \frac{lb}{Ft^3}$

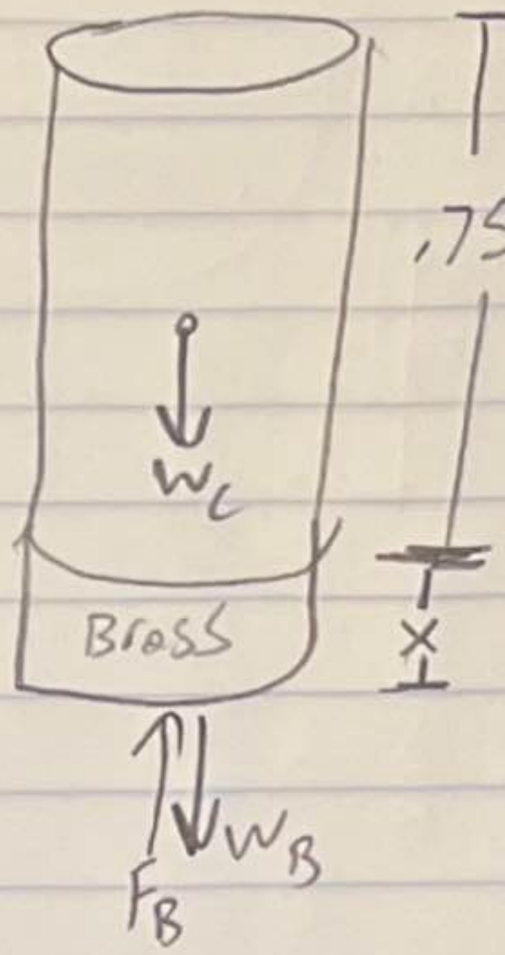
$F_b = 1.31bs$

$F_{Springs} = W - F_b$

$F_{sp} = 14.61bs - 1.31bs$

$\boxed{F_{sp} = 13.31bs}$

5.24



$\gamma_B = 84 kN/m^3$

$\gamma_C = 6.456 kN/m^3$ $\gamma_W = 9.44 kN/m^3$

$F_b = W$ $W = W_C + W_B$

$F_b = \gamma_W V_{Body}$ $V_{Body} = V_C + V_B$ $V = \frac{\pi}{4} D^2 h$

$\frac{9.44 kN}{m^3} \cdot \frac{\pi}{4} D^2 (.75m + x) = \left(\frac{6.456 kN}{m^3} \cdot .75m + \frac{84 kN}{m^3} x\right) \frac{\pi}{4} D^2$

$7.08 \frac{kN}{m^2} + 9.44 \frac{kN}{m^2} x = 4.842 \frac{kN}{m^2} + \frac{84 kN x}{m^2}$

$x = .03m$ or $30mm$