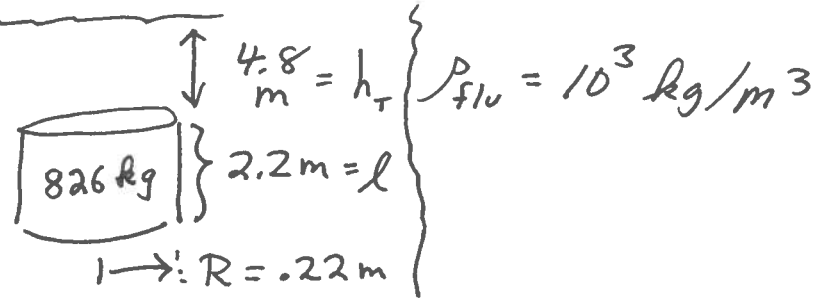
11- Buoyant Force Version A



① $P_{TOP} = \rho g h_T = 10^3 (9.8)(4.8)$ (kg/m^3, m/s^2, m)

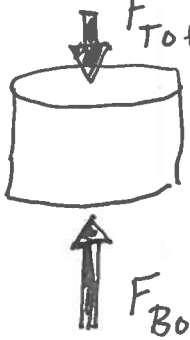
$\boxed{P_T = 4.7E4}$ units are $\frac{kg}{ms^2}$ or Pa (pascals)

② B = Buoyant force $= M^* g$ where $M^* = (V_{cyl.})(\rho_{water}) = \pi R^2 \ell \rho_{flu} = \pi (.22)^2 (2.2) 10^3$

$B = (9.8)\pi (.22)^2 (2.2) \times 10^3 = \boxed{3.28 \times 10^3 \text{ Newtons} = \text{Buoyant force}}$

③ $F_{Top} = P_{Top} A = P_T \pi R^2 = (4.7 \times 10^4)(\pi)(.22)^2 = \boxed{7.15 \times 10^3 N = F_{TOP}}$

④



$B = F_{Bot} - F_{TOP} \Rightarrow F_{BOT} = B + F_{TOP}$

3.28E3
+ 7.15E3

$\boxed{10.43\ E3\ N = F_{BOT}}$

Check ④:

$P_{BOT} = \rho g h_{BOT} = \rho g (2.2 + 4.8)$ meters

$= (10^3)(9.8)(7) = 6.86 \times 10^4$

$F_{BOT} = \pi R^2 P_{BOT} = \pi (.22)^2 (68600)$

$= 10431 \simeq 1.04 \times 10^4$ Newtons

checks!