HW 1 | Thermodynamics | Will Burtlak

① 356.7 boiling, °C — 100 boiling, °X

-38.9 freezing, °C — 0 freezing, °X

-273 Abs. zero, °C — -459.17 Abs. zero, °X

② $31.5(6.89476) = P + 101.325$

$P = 318.5099$ kPa

1 atm = 101.325 kPa

1 Psi = 6894.76 Pa

$\frac{2300(9.81)}{A} = 31.5(6894.76) \Rightarrow A = .103888\ m^2$

③ $.924 = \frac{\rho}{997}$

$921.228 = m/.0032 \Rightarrow m = 2.9479$ kg

④ $\Sigma F_y = 0 = -my - k(.15) - 101325(.02) + P(.02)$

$0 = -5(9.81) - 3500(.15) - 101325(.02) + P(.02)$

$P = 130,027.5$ Pa

⑤ $P(z) = P_a + mg/A + P(h - z) + \rho g(z_L - z)$

$P(0) = 101325 + \frac{15(9.81)}{.05} + 104268(.5 - 0) + 997(9.81)(.2)$

$P(0) = 2.1832\ E5$ Pa

* Assuming the bar is not moving...

$\Sigma F_y = P(.05) - mg - 101325(.05) = 0$

$P = 104268$ Pa

(6)

$P(z) = P_a + \rho g (h_1 - z)$

$P(h_1) = P_{h_1} \Rightarrow \quad \rho(P_a) = .007 \times 101325) = 709.275 \text{ kg/m}^3$

$P(0) = 101325 + \rho g (h_1 - 0) = 101325 + 709.275(9.81)(5) =$

$P(0) = 136,115 \text{ Pa}$