HW Module 2

5/23/22
Logan Kody

6: True

7: False - atmospheric pressure varies from 13.8-15.3psia

8: False: Absolute pressure cannot be negative

9: True

10: False: An absolute vacuum is the lowest pressure possible which is about 101kPa.

11: $\Delta P = \gamma h$ $h = 4000ft$ $\Delta P = .07641 \frac{lb}{ft^3} \times 4000ft \times \frac{1ft^2}{144in^2}$

$\gamma_{air} = .07641 lb/ft^3$

$P_{atm} = 14.7 lb/in^2$ $\Delta P = 2.12 psia$

$P = P_{atm} - \Delta P$ $14.7 - 2.12 = \boxed{12.58 psia}$

13: $P_{abs} = P_g + P_{atm}$

at surface $h = 0 \Rightarrow \Delta P = 0$ $\boxed{P_{gage} = 0}$

41: $P_{Air} = ?$

$P_A = 180 PSig$

$Sg_{oil} = .9$

$\gamma_w = 62.4 lb/ft^3$

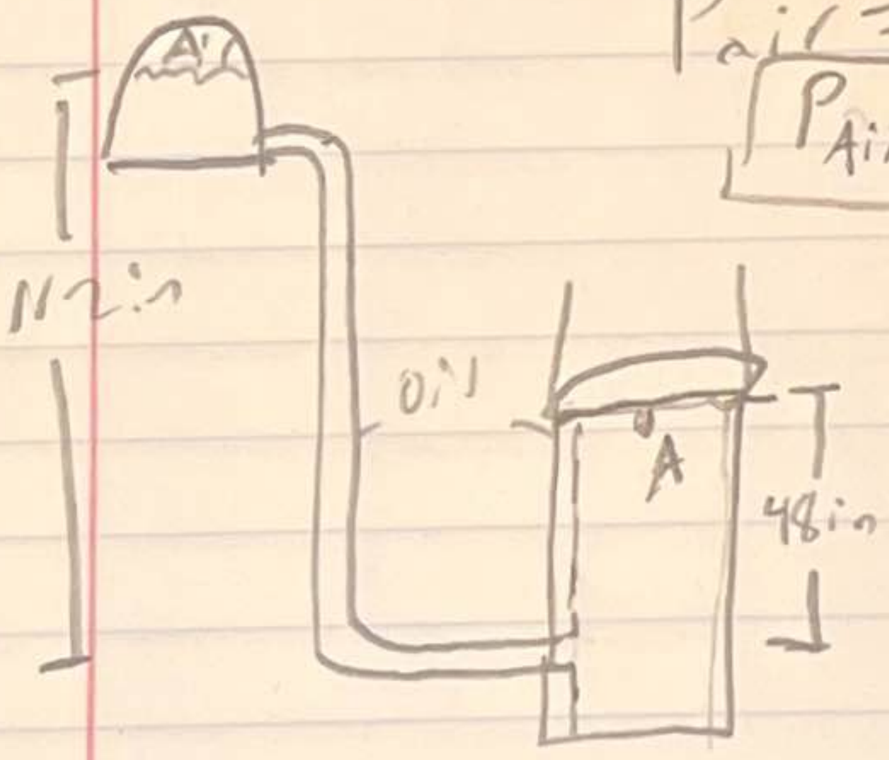
$\gamma_{oil} = .9 \times 62.4 = 56.16 lb/ft^3$

$P_{air} = P_A + 4ft\,\gamma_{oil} - 9.33ft\,\gamma_{oil}$

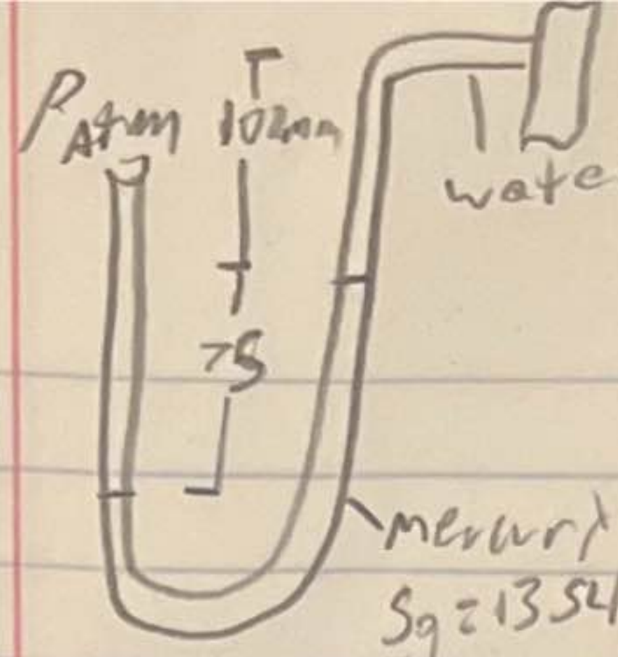
$P_{air} = 180 + 4ft(56.16 lb/ft^3) - 9.33ft(56.16 lb/ft^3)$

$P_{air} = 180 lb/in^2 + 299.33 \frac{lb}{ft^2} \times \frac{1ft^2}{144in^2}$

$\boxed{P_{Air} = 177.92 psia}$



62:



$\gamma_{water} = 9.81 \frac{KN}{m^3}$

$\gamma_{Hg} = 132.83 \frac{KN}{m^3}$

$P_{atm} = P_A - \gamma_{Hg} \cdot .075m - \gamma_w \cdot 1m$

$P_{atm} - P_A = P_{gage}$

$P_{gage} = -132.83 \frac{KN}{m^3} \cdot .075m - 9.81 \frac{KN}{m^3} \cdot .1m = \boxed{-10.94 KPa}$

83: Barometer reads 30.65in of Hg

$\gamma_w = 62.4 lb/ft^3$

$\gamma_{Hg} 844.846 lb/ft^3 \times \frac{1ft^3}{(12in)^3} = .489 lb/in^3$

$P_{atm} = \gamma_{Hg} \times h = .489 \frac{lb}{in^3} \times 30.65in$ $\boxed{P_{atm} = 14.99 psia}$

90: $-68.2 KPa = \gamma_{Hg} \times h$ $\gamma_{Hg} = 132.83 \frac{KN}{m^3}$

$h = -.513m \times m^m/m$ $\boxed{h = -513mm}$

94: $P_{Abs} = P_g + P_{atm}$ $P_g = P_{Abs} - P_{atm}$

$P_g = 16m \times 9.81 \frac{KN}{m^3}$ $\boxed{P_g = 156.96 KPa}$