Homework 1.2	MET 330	Group 4

3.6) True

3.7) False, pressure changes with elevation, the relationship can be defined as $\Delta p = \gamma h$

3.8) False, Absolute pressure will always be positive, a perfect vaccum would have an absolute pressure of $\emptyset$

3.9)

3.10) True

3.11) $h = 4{,}000\ ft$, using table E.3 $\boxed{P = 2.72\ psi}$

3.13) $\boxed{P_{gage} = \emptyset}$

3.41) $\Delta P = \gamma h$ $\quad sg_{oil} = 0.90$ $\quad P_A = 180\ psig$

$$h = \frac{32in + 80in - 48in}{12ft} = 5.33\ ft = 64in$$

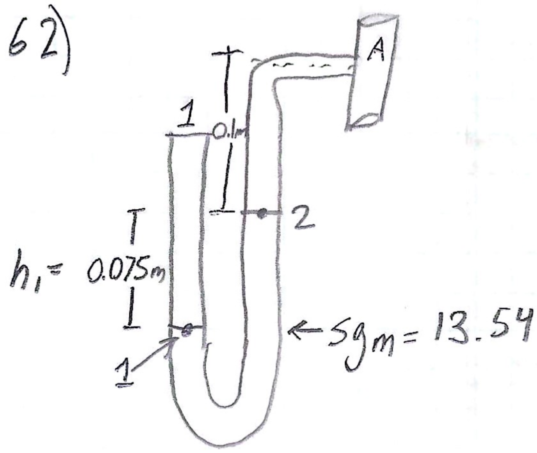
$$sg_{oil} = \frac{\gamma_{oil}}{\gamma_w @ 4°C} \Rightarrow \gamma_{oil} = (0.90)(62.4\ lb/ft^3) = 56.16\ lb/ft^3$$

$$\frac{56.16\ lb/ft^3}{12^3} = 0.0325\ lb/in^3$$

$$\Delta P = (0.0325\ lb/in^3)(64in) = 2.08\ psig$$

$$P_{Air} = 180\ psig - 2.08\ psig = \boxed{177.92\ psig}$$

3.62)



$P_1 = 0\,psig$

$P_2 = \gamma_m h_1 \qquad \gamma_m = (1000\ kg/m^3)(13.54)$

$P_2 = (13{,}540\ kg/m^3)(0.075m) = 1015.5\ kg/m^2 \cdot 9.81\ m/s^2$

$P_2 = 9962.055\ Pa\ (gage)$

$P_3 = \gamma_{H_2O} h_2 = (1{,}000\ kg/m^3)(0.1)(9.81 m/s^2) = 981\ Pa$

$P = P_1 - P_2 - P_3 = -10943.01\ Pa = \boxed{-10.9\ kPa}$

3.83) $P_{atm} = \gamma_m h$

$P_{atm} = (848.7\ lb/ft^3)(\frac{1}{12})(\frac{1}{12})(\frac{1}{12})(30.65\ in) = \boxed{15.05\ psi}$

3.90) $P_{gage} = -68.2\ kPa = -68{,}200\ Pa$

$1\ Pa = 0.0075\ mmHg$

$P = (-68{,}200)(0.0075) = \boxed{-511.5\ mmHg}$

3.94) $P_1 = 0\ Pa\ (gage)$ $h = 16m$

$\Delta P = \gamma_{H_2O} h = (1000\ kg/m^3)(16m)(9.81 m/s^2) = 156\,960\ Pa$

$= \boxed{156.96\ kPa}$