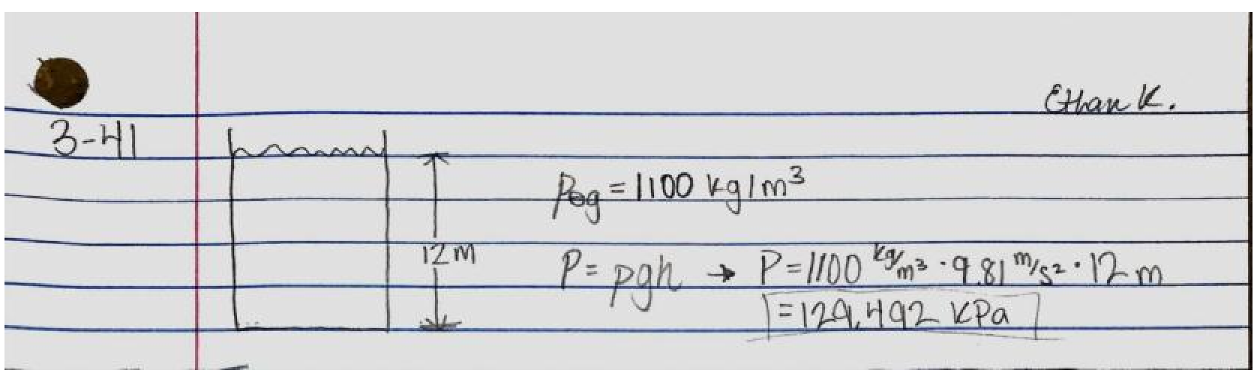
Group 4
Ch3: 6 to 10,11,13,41,62,83,90,94

Review the solved problems that were discussed in class and the ones under "Lectures". Write a paragraph or two on what you learned.

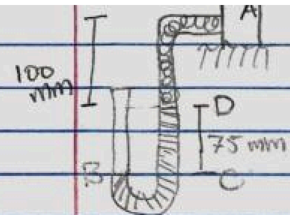
The homework assignment explores these topics, demanding a thorough application of the equations that we learned in Chapter 3 around pressure. In tackling the 12 assigned problems, an emphasis was placed on the visualization of each scenario, requiring a comprehensive understanding to truly understand the questions. Employing the learned equations was not merely a computational exercise but a process that involved delving into the core of each problem, enhancing our grasp of the underlying principles.

3.6 - **True**
3.7 - **False - pressure changes with altitude and throughout the day**
3.8 - **False**
3.9 - **True - negative pressure indicates a vacuum**
3.10 **False - the absolute pressure of the reading is -74 kPa(abs), absolute pressure should always be positive.**
3.11 - **Assuming that water is the test liquid which has a specific weight of 62.4 lb/in^2 the elevation of the aircraft is around 4000 ft above sea level, and the conversion of ft to in^2 is 1/144. The resulting pressure of the atmosphere would be 1733 psi.**
3.13 - **The gauge pressure is 0, given that the gage pressure is at the surface of the milk**
3.41



3.62

3-62



B is exposed to atmosphere so initial pressure is 101 kpa.
Pressure varies with vertical distance so since B and C are connected with the same fluid, $P_B = P_C = 101$ Kpa

Moving up in a fluid reduces the pressure, so the water portion will reduce the pressure in addition to the mercury portion.

$13.54 = \frac{\rho_{Hg}}{\rho_{H2O}} \rightarrow 13.54 \cdot 1000\ kg/m^3 = \rho_{Hg} = 13{,}540\ kg/m^3$

$\rho_{H2O} = 1000\ kg/m^3 \quad \rho_{Hg} = 13{,}540\ kg/m^3$

$P_A = P_C - (\rho_{Hg} \cdot 75 \cdot \frac{1m}{1000mm}) - (\rho_{H2O} \cdot 100 \cdot \frac{1m}{1000mm})$

$P_A = 100.236$ Kpa (atm)

$P_A = -1.1155$ Kpa (gage)

1 of 2

3.83

3-83

Reading of barometer inches mercury corresponding to atm pressure of 14.2 psig

14.2 psi

1 psi = 2.036 in Hg / Mercury

$14.2 \times \frac{(2.036)}{1} = 28.9 \text{ Hg}$

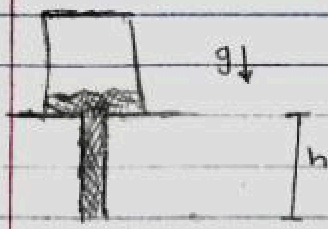
3.90

3.90) The Pressure in a Vacuum chamber is −12.6 psig. Express this Pressure in Hg.

$-12.6 \text{ PSI} = -12.6 \text{ lb/in}^2$

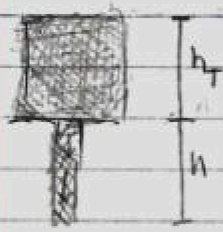
$-12.6 \frac{\text{lb}}{\text{in}^2} \times \frac{2.036 \text{ Hg}}{1 \text{ lb/in}^2} = \boxed{-25.65 \text{ Hg}}$

3.94



$P = \rho g h \quad P = 1000\,\text{kg/m}^3 \cdot 9.81\,\text{m/s}^2 \cdot h$

This P would be the empty tank's pressure. We need a max of 160 kpa ~~at the~~ outlet whether the tank is full or not.



$P = \rho g h + \rho g h_T \rightarrow P = \rho g (h + h_T)$

$P/\rho g = h + h_T$

$\dfrac{P}{\rho g} - h_T = h$

Assuming 10 meter tank:

$P = 160{,}000\,\text{Pa} \quad \rho_w = 1000\,\text{kg/m}^3 \quad h_T = 10\,\text{m}$

$h = \dfrac{160{,}000}{9810} - 10$

$= 6.31\,\text{m}$

$h_T = 25\,\text{m}$:

$P = 160000\,\text{Pa}\,;\ \rho_w = 1000\,\text{kg/m}^3\,;\ h_T = 25\,\text{m}$

$h = \dfrac{160{,}000}{9810} - 25 = -8.69\,\text{m}$

Above 16.31 meters in height the tank needs to be lower than the ground to have an outlet at 160 kpa.