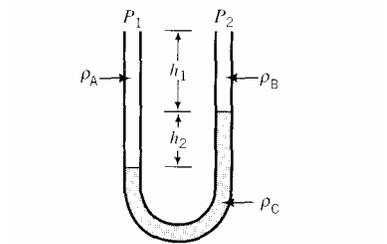


CHE 201
HW# 4

Q1)

Three different liquids are used in the manometer below



- Find an expression for $P_1 - P_2$ in terms of ρ_A , ρ_B , ρ_C , h_1 , and h_2
- Suppose you are given the following information

Fluid A is unknown

Fluid B is Water

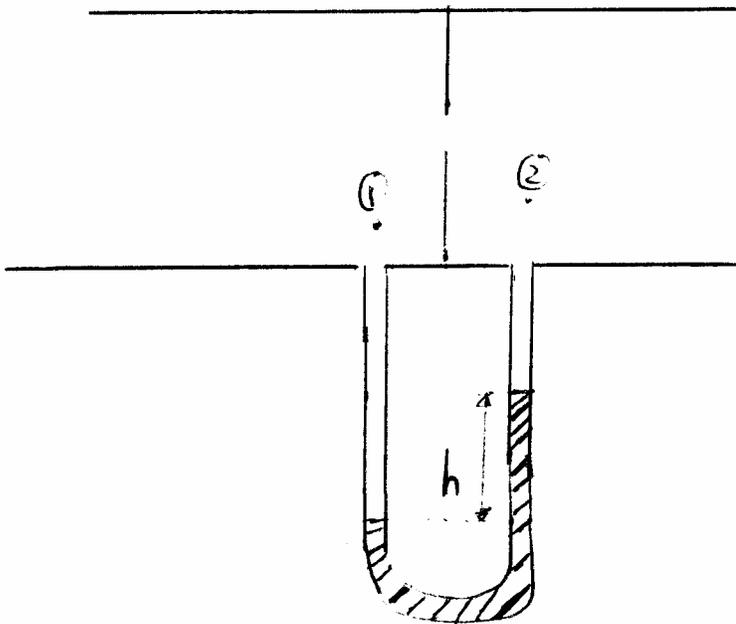
Fluid C has a specific gravity of 1.37

$P_1 = 123 \text{ kPa}$, $P_2 = 121 \text{ kPa}$

$h_1 = 30 \text{ cm}$, $h_2 = 24 \text{ cm}$

Calculate the specific gravity of fluid A

Q2) An Orifice meter is a plate with a hole put in a pipe to measure the volumetric flow rate of Acetone by reading h as shown in the diagram



The fluid in the pipe is Acetone and the manometer fluid has a specific gravity of 1.1

The following calibration curve is done where the volumetric flow rate is measured at different h as given in the table below

h (mm)	V (ml/s)
5	62
12	96
18	117
24	135
28	146
35	163
40	174

- Find an equation relating $\Delta P = (P_1 - P_2)$ to h
- If the volumetric flow rate changes with the pressure drop as follows

$$V = K(\Delta P)^n$$

Verify this equation graphically and find n and K

c) If the reading of the manometer is 33 mm ,determine the following

- Volumetric flow rate
- Mass flow rate
- Molar flow rate

Q(3)

Change the following

- a) $T=100^{\circ}\text{F}$ to $^{\circ}\text{R}$, $^{\circ}\text{C}$, K
b) $T= - 40^{\circ}\text{C}$ to K, $^{\circ}\text{F}$, $^{\circ}\text{R}$
c) $\Delta T = 70^{\circ}\text{C}$ to K, $^{\circ}\text{F}$, $^{\circ}\text{R}$
d) $\Delta T = 120^{\circ}\text{R}$ to $^{\circ}\text{F}$, $^{\circ}\text{C}$, K

Q(4)

The ideas gas law is a relation of absolute pressure P (mmHg) ,volume V (liters),N (gmole),and absolute temperature T (K) as follows

$$PV=62.36 N T$$

- a) Convert the equation if the pressure is in atm
b) Convert the equation if P(psia) ,V(ft³),N(lbmole),T($^{\circ}\text{R}$)
c) A mixture has 30mole% CO ,and 70 mole % N₂ is stored in a cykider with a volume of 3.5 ft³ ar a temperature of 100 $^{\circ}\text{F}$.The gauge pressure is 500 psi.Caculate the number of moles of CO in the cylinder in lbmoles.

Atomospheric pressure is 1 atm