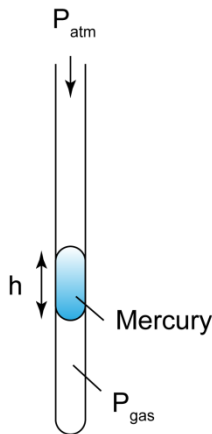


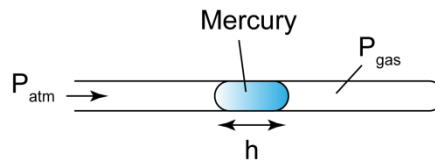


Pressure in a Capillary Tube

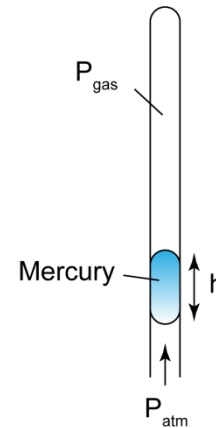


$$P_{\text{gas}} = P_{\text{atm}} + h\rho g$$

P_{gas} = gas pressure in the capillary tube
 P_{atm} = atmospheric pressure
 h = length of the captured mercury
 ρ = density of mercury
 g = gravitational field strength



$$P_{\text{gas}} = P_{\text{atm}}$$



$$P_{\text{gas}} = P_{\text{atm}} - h\rho g$$

(Pa or $N m^{-2}$)
(Pa or $N m^{-2}$)
(m)
($kg m^{-3}$)
($N kg^{-1}$)

Example 1

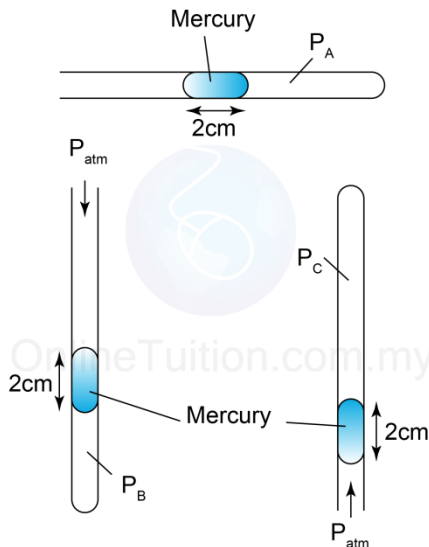


Figure above shows 3 identical capillary tubes with one end sealed and containing a column of mercury. P_A , P_B and P_C are the gas pressure in the capillary tubes respectively. Find the value of P_A , P_B and P_C . [Atmospheric pressure = 76cmHg]

$$[P_A = 76\text{cmHg}, P_B = 78\text{cmHg}, P_C = 74\text{cmHg}]$$

[Solution]

Example 2

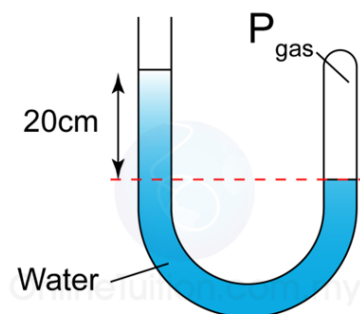


Figure 9 shows some air trapped in a J-tube. Find the pressure of the trapped air. [Density of water = 1000 kg/m^3 ; Atmospheric pressure = 100,000 Pa]

$$[P_{\text{gas}} = 102,000 \text{ Pa}]$$

[Solution]