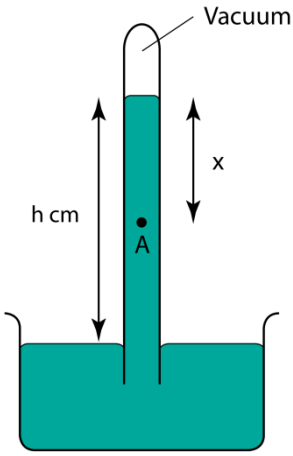
Simple Barometer

2 Cases

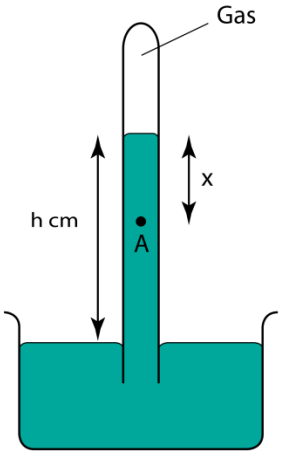
No air trapped in the tube



Pressure at A = x cmHg

Atmospheric pressure = h cmHg

Some air trapped in the tube

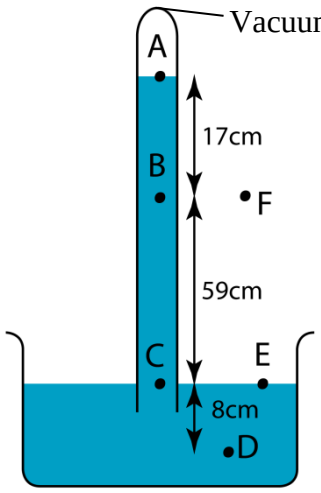


Pressure at A = x cmHg + P_{gas}

Atmospheric pressure = h cmHg + P_{gas}

Example 1

Find the pressure at point A, B, C, D, D, E and F in the unit of cmHg and Pa.
(Density of mercury = 13600kgm^{-3})



Pressure in unit cmHg	Pressure in unit Pa
P_A =	P_A =
P_B =	P_B =
P_C =	P_C =
P_D =	P_D =
P_E =	P_E =
P_F =	P_F =

Simple Barometer

Example 2

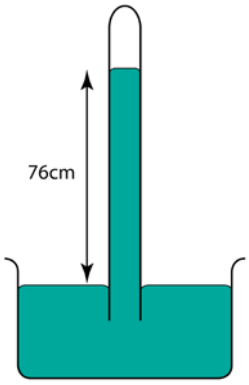
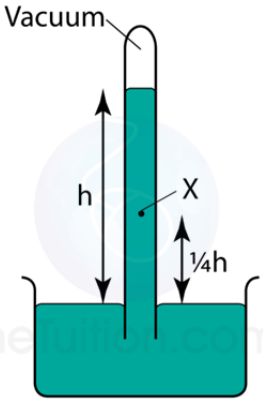


Figure above shows a simple mercury barometer. What is the value of the atmospheric pressure shown by the barometer?

[103360Pa]
[Step by step solution]

Example 3



In figure above, the height of a mercury barometer is h when the atmospheric pressure is 101 000 Pa. What is the pressure at X?
[Density of Mercury = 13 600 kg/m³]

[75,750Pa]
[Step by step solution]

Example 4

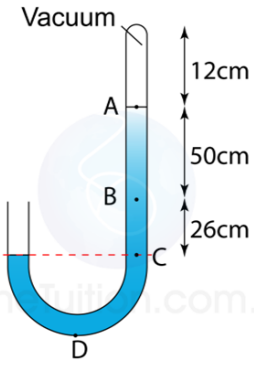


Figure above shows a mercury barometer whereby the atmospheric pressure is 760 mm Hg on a particular day. Determine the pressure at point

a. *A,*
b. *B,*
c. C.

[Density of Mercury = 13 600 kg/m³]

[a. 0; b. 50cmHg/68,000Pa; c. 76cmHg/103360Pa]
[Step by step solution]

Simple Barometer

Example 5

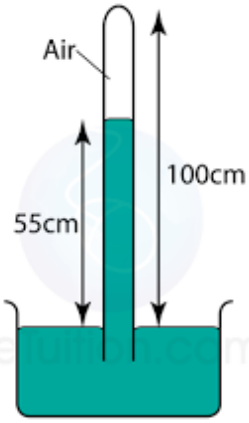


Figure above shows a simple barometer, with some air trapped in the tube. Given that the atmospheric pressure is equal to 101000 Pa, find the pressure of the trapped gas. [Density of Mercury = 13 600 kg/m³]

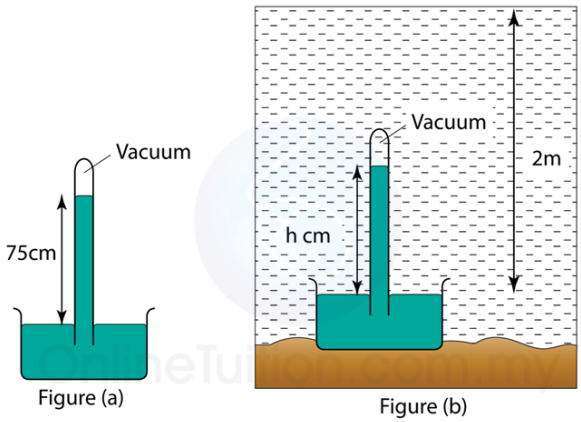
[26,200Pa]
[Step by step solution]

Example 6

If the atmospheric pressure in a housing area is 100 000 Pa, what is the magnitude of the force exerted by the atmospheric gas on a flat horizontal roof of dimensions 5m ×4m?

[2,000,000N]
[Step by step solution]

Example 7



Figure(a) above shows the vertical height of mercury in a mercury barometer in a laboratory. Figure(b) shows the mercury barometer in water at a depth of 2.0 m. Find the vertical height (h) of the mercury in the barometer in the water. Given that the pressure at a depth of 10 m from the water surface is 76 cmHg. [Density of Mercury = 13 600 kg/m³]

[90cm]
[Step by step solution]