PHYSICAL CHEMISTRY

DPP

DAILY PRACTICE PROBLEMS

DPP No. 24

Total Marks : 31

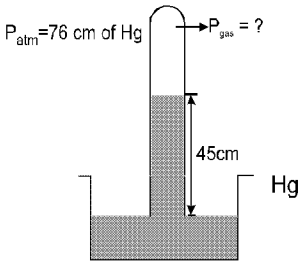
Max. Time : 38 min.

Topic : Gaseous State

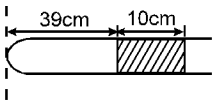
Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1	(3 marks, 3 min.)	[3, 3]
Subjective Questions ('–1' negative marking) Q.2 to Q.8	(4 marks, 5 min.)	[28, 35]

1. If some gas is trapped above the mercury column in a Barometer during measurement of atmospheric pressure, the height of Hg column is observed to be h. Then :
(A) h > 76 cm (B) h < 76 cm (C) h = 76 cm (D) cannot be predicted.

2. In the following arrangement, find the pressure of the confined gas (in cm of Hg).

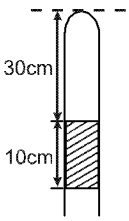


3. Given a one meter long glass tube closed at one end having a uniform cross-section containing a mercury column of 10 cm length, at a distance of 39 cm from the closed end. By what distance would this column move down, if the tube is held vertical with the open end downwards ? [Take atmo
spheric pressure to be 75 cm of Hg]



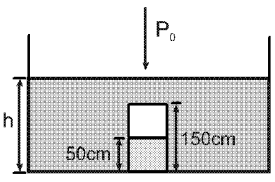
4. If another liquid L (ρ = 10.2 g/cm^3) is used in place of mercury, then what should be the minimum length of Barometer tube to measure normal atmospheric pressure ?
(Take normal atmoshperic pressure to be 76 cm of Hg).

5. Given a long glass tube closed at one end having a uniform cross-section containing a mercury column of 10 cm length, at a distance of 30 cm from the closed end when held vertically as shown. The air trapped above the Hg column has pressure 85 cm of Hg. What will be the length of air column
if the glass tube is held horizontally ?

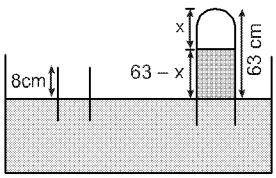


6. A glass tube with a sealed end is completely submerged in a vessel with mercury vertically. The air column is 15 cm long. To what height must the upper end be raised above the level of Hg, so that the level of Hg inside the tube is at the level of Hg in the vessel ? [Atmospheric pressure = 75 cm of Hg column]

7. A cylindrical diving bell (initially in open air), whose length is 150 cm, is lowered to the bottom of a tank. The water is found to rise 50 cm in the bell. Find the depth of the tank. Assume the atmospheric pressure at the surface as equivalent to 1000 cm height of water and the temperature as constant



8. An open glass tube is immersed in mercury in such a way that a length of 8 cm extends above the mercury level. The open end of the tube is then closed and raised further by 55 cm. What will be the length of air column above mercury in the tube ?
[Atmospheric pressure = 76 cm of Hg]



Answer Key

DPP No. # 24

1.	(B)	**2.**	31 cm of Hg.	**3.**	x = 6 cm	**4.**	≈ 101.3 cm.
5.	x = 26.84 cm	**6.**	18 cm	**7.**	550 cm	**8.**	19 cm.

Hints & Solutions

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2. $P_{gas} = 76 - 45 = 31$ cm of Hg

3. x = 6 cm

4. ≈ 101.3 cm.

5. x = 26.84 cm

6. $(75 + 15)\rho g \times 15A = 75\rho g \times hA$
$\therefore h = 18$ cm **Ans.**

7. 550 cm

8. 19 cm.