

6.4.3 Measurement of Pressure in Pipelines

The pressure in pipelines can be measured by a manometer. The manometer consists of a U-tube containing water or mercury (Fig. 3.3a). When both arms are open to the atmosphere the same atmospheric pressure is exerted on the liquid surfaces A and B and these are at the same horizontal level. In order to measure the pressure of the gas supply in the pipeline, it is connected to the pipeline by a length of rubber tubing. The gas exerts pressure on the surface A, with the result that the level B rises until the

pressure at C on the same horizontal level as A becomes equal to the gas pressure. Thus:

Pressure of gas = atmospheric pressure + pressure due to the liquid column BC.

It follows therefore that the excess pressure of the gas above that of the atmosphere is given by the pressure of the water column BC and is therefore equal to $9.8 h \rho \text{ Nm}^{-2}$.

A variant of this is the rotameter (Fig. 3.3b). Here the flowing gas pushes a float up a tapered tube to the point where the pressure difference between the upper and lower float surfaces equals the float weight. The flow is read from the float height.

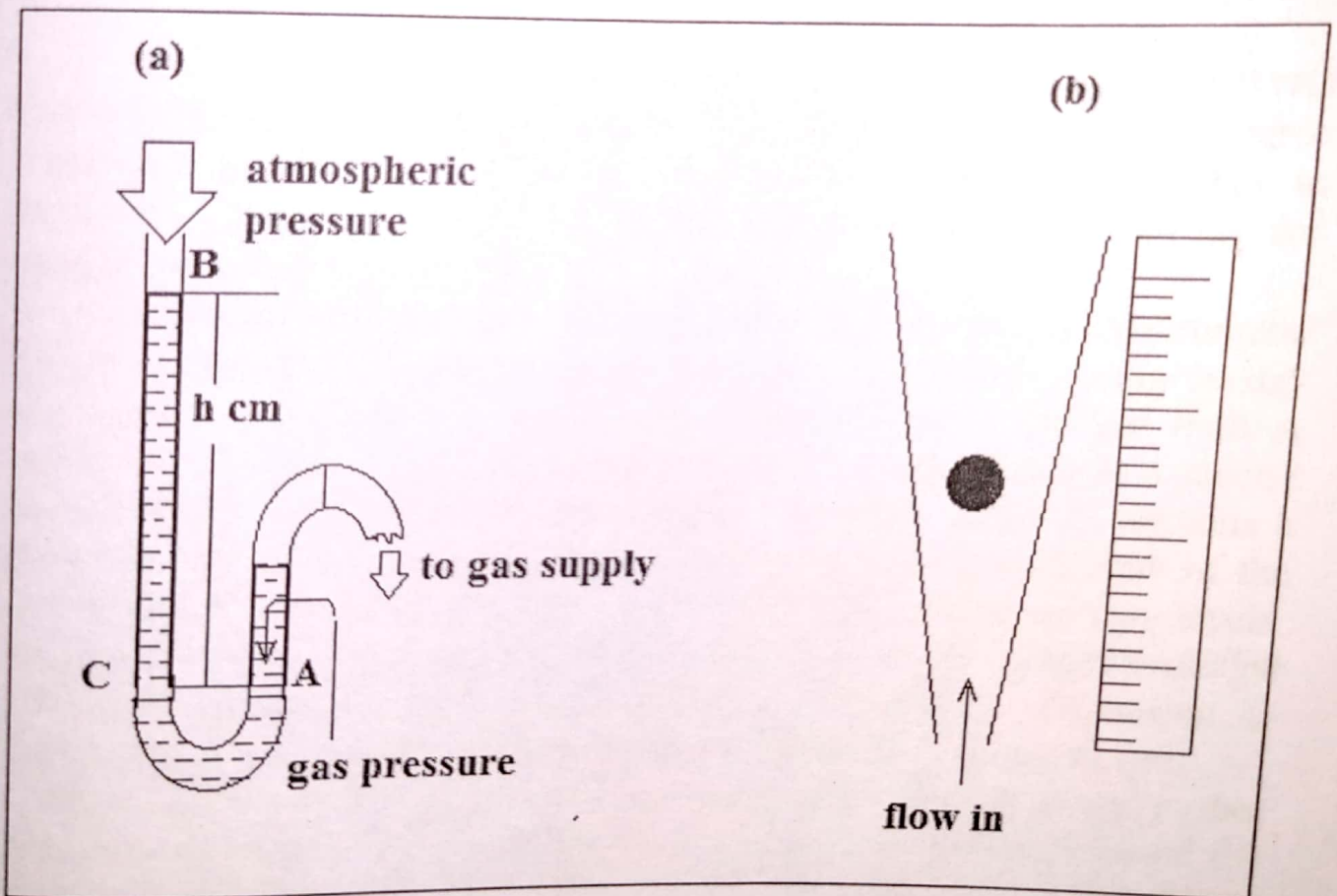


Figure 6.3(a) Manometer

(b) Rotameter