PROBLEM 1.45

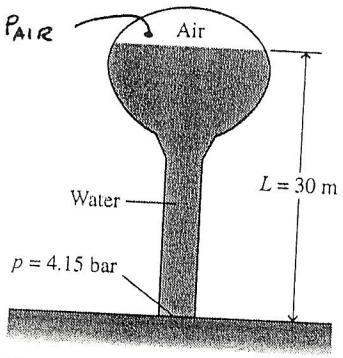

Fig. P1.45

Ignoring the vertical variation in pressure of the air trapped above water level,

$$p = P_{AIR} + \rho g L$$

(p: pressure at the base)

$$\Rightarrow \quad P_{AIR} = p - \rho g L$$

$$= 4.15\ \text{bar} - \left(10^3 \frac{\text{kg}}{\text{m}^3}\right)\left(9.81 \frac{\text{m}}{\text{s}^2}\right)(30\ \text{m}) \left| \frac{1\ \text{N}}{1\ \text{kg}\cdot\text{m/s}^2} \right| \left| \frac{1\ \text{bar}}{10^5 \frac{\text{N}}{\text{m}^2}} \right|$$

$$= 4.15\ \text{bar} - 2.94\ \text{bar} = 1.21\ \text{bar} \quad \longleftarrow$$