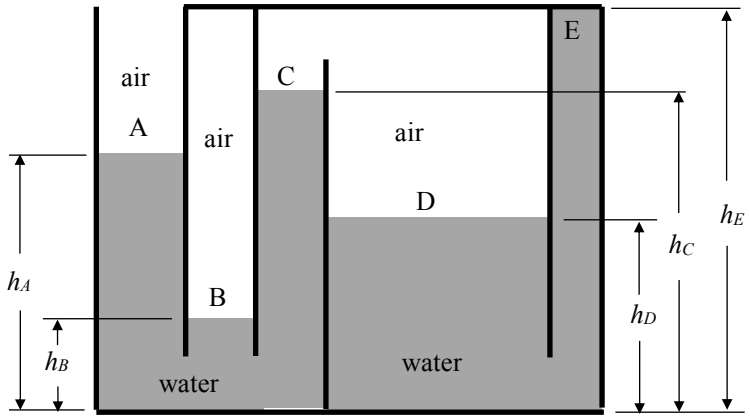
Determine the gage pressure at points B, C, D, and E in the system shown below.




$h_A$ = 6 m
$h_B$ = 2 m
$h_C$ = 7 m
$h_D$ = 5 m
$h_E$ = 10 m

SOLUTION:

First determine the pressure at point B,

$$\boxed{p_B = p_A + \rho g\left(h_A - h_B\right)}. \quad (1)$$

Note that the pressure at A is $p_A = p_{\text{atm}} = 0$ (gage).

Now determine the gage pressure at C using the known pressure at B,

$$\boxed{p_C = p_B - \rho g\left(h_C - h_B\right)} \quad (2)$$

The pressure at point D will be the same as the pressure at point C since both contact the same air and we're assuming the variations in air pressure over the small elevations in this problem are negligible,

$$\boxed{p_D = p_C}. \quad (3)$$

The pressure at point E is,

$$\boxed{p_E = p_D - \rho g\left(h_E - h_D\right)}. \quad (4)$$

Using the given data,

$p_A$ = $p_{\text{atm}}$ = 0 (gage)
$\rho$ = 1000 kg/m$^3$
$g$ = 9.81 m/s$^2$
$h_A$ = 6 m
$h_B$ = 2 m
$h_C$ = 7 m
$h_D$ = 5 m
$h_E$ = 10 m

$\Rightarrow$

$p_B$ = 39.2 kPa (gage)
$p_C$ = -9.8 kPa (gage)
$p_D$ = -9.8 kPa (gage)
$p_E$ = -58.9 kPa (gage)