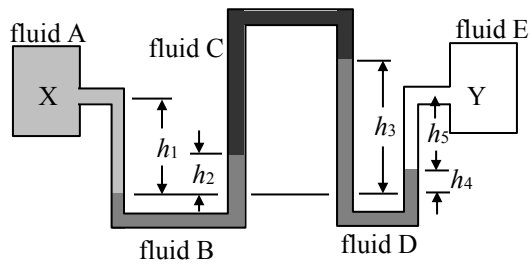
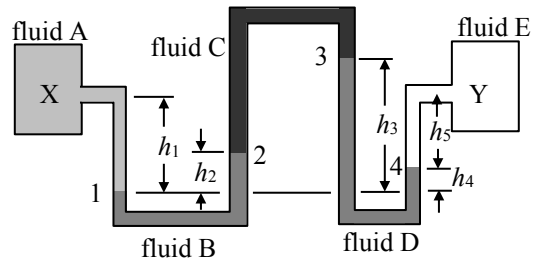


Determine the pressure difference between points X and Y in the system shown below.



SOLUTION:

First indicate some reference points in the manometer system as shown in the figure below.



Now determine the pressure at the various reference points.

$$p_1 = p_X + \rho_A g h_1 \quad (1)$$

$$p_2 = p_1 - \rho_B g h_2 \quad (2)$$

$$p_3 = p_2 - \rho_C g (h_3 - h_2) \quad (3)$$

$$p_4 = p_3 + \rho_D g (h_3 - h_4) \quad (4)$$

$$p_Y = p_4 - \rho_E g h_5 \quad (5)$$

Now combine Eqns. (1) - (5).

$$\therefore p_Y = p_X + \rho_A g h_1 - \rho_B g h_2 - \rho_C g (h_3 - h_2) + \rho_D g (h_3 - h_4) - \rho_E g h_5 \quad (6)$$