CE 307 Fluid Mechanics FALL 11-12 HOMEWORK 1 SOLUTIONS


(ch.3, p.80, Pr.3.58 and 3.59, see the corresponding figures given in the textbook)

3.58 \[ p_B + \gamma_w h_{w1} + \gamma_m h_{w2} - \gamma_o h_o = p_A \]
\[ p_B + \gamma_o (0.15 \text{ m}) + \gamma_m (0.15 \text{ m}) - \gamma_o (0.25 \text{ m}) = p_A \]
\[ p_B + \gamma_o (0.15 \text{ m} - 0.25 \text{ m}) + \gamma_m (0.15 \text{ m} + 0.2 \text{ m}) = p_A \]
\[ p_B - 0.98 \text{ kPa} + 46.49 \text{ kPa} - 1.32 \text{ kPa} = p_A \]
\[ p_A - p_B = 44.19 \text{ kPa} \]

3.59 \[ p_B - \gamma_w h_{w1} - \gamma_o h_o = p_A - \gamma_o h_{w2} \]
\[ p_B - \gamma_o (0.61 \text{ m}) - 0.9 \gamma_o (0.91 \text{ m}) = p_A - \gamma_o (3.35 \text{ m}) \]
\[ p_B - 5.94 \text{ kPa} - 8.03 \text{ kPa} = p_A - 32.86 \text{ kPa} \]
\[ p_A - p_B = 18.89 \text{ kPa} \]