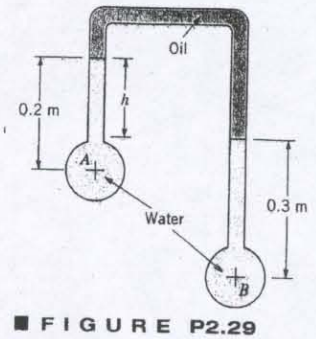
2.29

2.29 The inverted U-tube manometer of Fig. P2.29 contains oil ($SG = 0.9$) and water as shown. The pressure differential between pipes A and B, $p_A - p_B$, is -5 kPa. Determine the differential reading, h.



■ FIGURE P2.29

$$p_A - \gamma_{H_2O}(0.2\,m) + \gamma_{oil}(h) + \gamma_{H_2O}(0.3\,m) = p_B$$

Thus,

$$h = \frac{(p_B - p_A) + \gamma_{H_2O}(0.2\,m) - \gamma_{H_2O}(0.3\,m)}{\gamma_{oil}}$$

$$= \frac{5\times10^3\,\frac{N}{m^2} - \left(9.80\times10^3\,\frac{N}{m^3}\right)(0.1\,m)}{0.9\times 9.80\times10^3\,\frac{N}{m^3}} = 0.456\,m$$