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Fluid Mechanics - 1

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Water flows steadily through a horizontal bend and discharges into the atmosphere as shown below (note that the pipeline upstream of the bend is not shown in the figure). The manometer reading is 210kPa. The resultant x-direction anchoring force,  $F_{Ax}$ , in the horizontal plane required to hold the bend in place is 8.0kN. Perform the following tasks:

1. Determine the flowrate through the bend (60%);
2. Determine the anchoring force in the y-direction,  $F_{Ay}$ . (20%)
3. Can the flow through the bend be considered as frictionless? Justify your answer quantitatively. (20%)

Gravity can be neglected in this problem. The density of water is  $1000\text{kg/m}^3$ .

