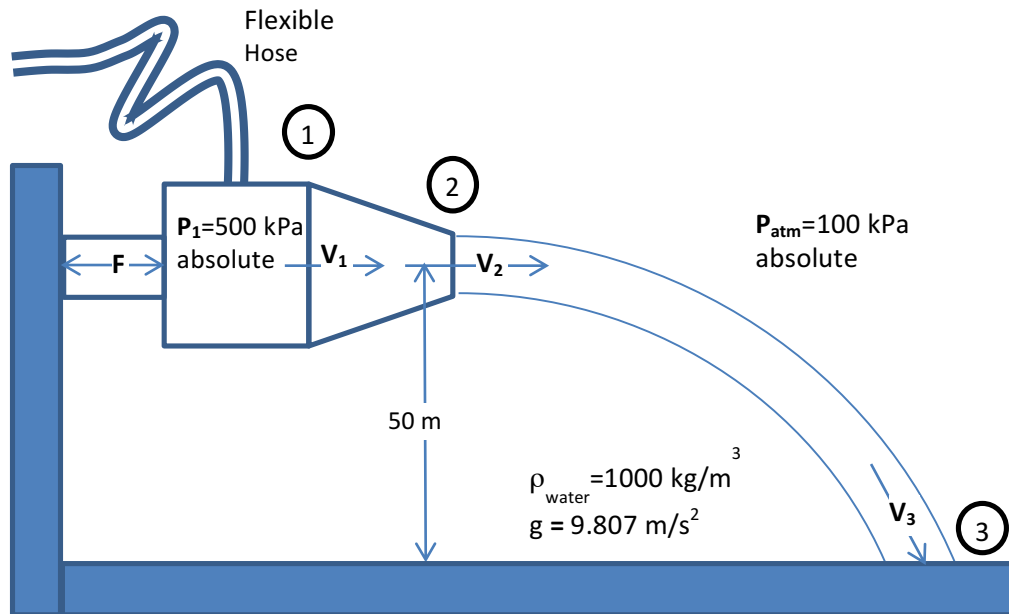


Fluids-Control Volume Analysis

A water jet device is mounted on a vertical surface as shown on the drawing. Water is steadily supplied through a flexible hose to maintain 500 kPa absolute pressure at section 1.



Show all work, clearly state assumptions, and mark answers clearly.

- (40%) The Area ratio  $A_1/A_2$  is 3.0. Neglecting friction, find the velocities  $V_1$  and  $V_2$ .
- (20%) If the area  $A_2$  is  $0.005 \text{ m}^2$ , find the mass flow rate.
- (20%) Find the magnitude and direction of the force  $F$  on the mounting stand.
- (30%) The exiting jet falls 50 m before striking a horizontal surface. Neglecting friction, find the magnitude of the jet velocity  $V_3$  when it strikes the horizontal surface.