**Answer on Question #72537-Physics-Mechanics-Relativity**

H2O is flowing smoothly through a closed pipe system. At one point the speed of the H2O is 3.0 m/s while at another point, 1.0 m higher the speed is 4.0 m/s. If the pressure is 20 kPa at the lower point, what is the pressure at the upper point? What would be the pressure at the upper point be if the H2O were to stop flowing and the pressure at lower point were 18 kPa?

**Solution**

1)

$$p_1 + \frac{\rho v_1^2}{2} = p_2 + \frac{\rho v_2^2}{2} + \rho g h$$

$$p_2 = p_1 + \rho\left(\frac{v_1^2 - v_2^2}{2} - gh\right)$$

$$p_2 = 20000 + 1000\left(\frac{3^2 - 4^2}{2} - (1)(9.8)\right) = 6700\ Pa = 6.7\ kPa.$$

2)

$$p_1 = p_2 + \rho g h$$

$$p_2 = p_1 - \rho g h$$

$$p_2 = 18000 - 1000\big((1)(9.8)\big) = 8200\ Pa = 8.2\ kPa.$$