P #E

Ch. 9 Worksheet

$P_1 = 3.00 \times 10^5$ Pa

$\rho_1 = \rho_2 = 1.00 \times 10^3$ kg/m^3

$v_1 = 1.00$ m/s

$r_2 = 1/4 \cdot r_1$ (OR $r_1 = 4 \cdot r_2$)

$A_1 = \pi \cdot r_1^2 = \pi(4 \cdot r_2)^2$

$= 16 \cdot \pi \cdot r_2^2$

$A_1 = 16 \cdot A_2$

$y_1 = y_2$

a) $A_1 \cdot v_1 = A_2 \cdot v_2$

$(16 \cdot A_2) \cdot (1.00 \text{ m/s}) = A_2 \cdot v_2$

$\boxed{v_2 = 16.0 \text{ m/s}}$

b) $P_1 + \rho_1 g y_1 + \frac{1}{2} \cdot \rho_1 \cdot v_1^2 = P_2 + \rho_2 g y_2 + \frac{1}{2} \cdot \rho_2 \cdot v_2^2$

$(3.00 \times 10^5 \text{ Pa}) + \frac{1}{2}(1 \times 10^3 \text{ kg/m}^3)(1 \text{ m/s})^2 = P_2 + \frac{1}{2}(1 \times 10^3 \text{ kg/m}^3)(16$

$\boxed{P_2 = 1.73 \times 10^5 \text{ Pa}}$