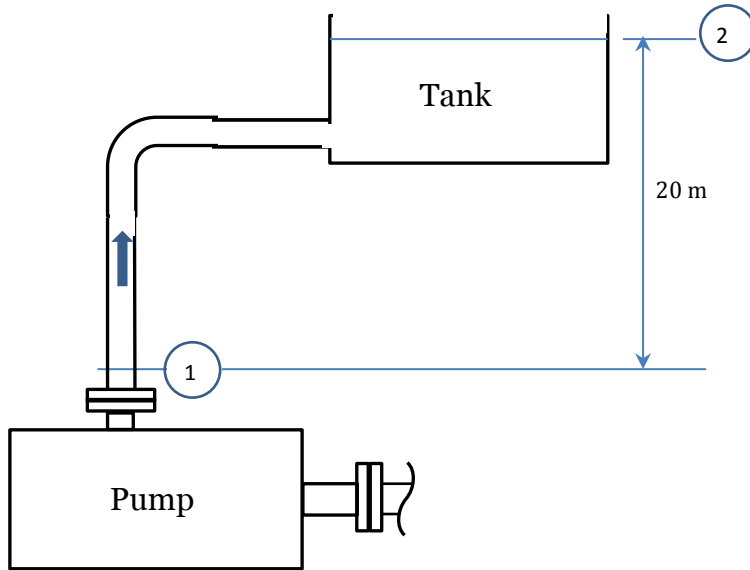


The diagram shows a pump delivering water ( $\rho = 1000 \text{ kg/m}^3$ ) through a pipe of 40 mm bore to a tank. Find the pressure at point (1) when the flow rate is  $1.4 \text{ dm}^3/\text{s}$ .



Area of bore:

$$A = \frac{\pi d^2}{4} = \frac{3.14 \times 0.04^2}{4} = 1.3 \times 10^{-3} \text{ m}^2$$

Mean velocity in pipe:

$$v = \frac{Q}{A} = \frac{0.0014}{1.3 \times 10^{-3}} = 1.1 \text{ m/s}$$

Bernoulli equation:

$$\frac{p_1}{\rho g} + \frac{v_1^2}{2g} = z_2 \rightarrow p_1 = \rho g z_2 - \rho \frac{v_1^2}{2} = 1000 \times 9.81 \times 0.2 - 1000 \times \frac{1.1^2}{2} = 1.96 \times 10^5 \text{ Pa}$$