Answer on Question # 37158

Physics – Mechanics | Kinematics | Dynamics

Question:

Two water pipes p and q having diameter 2 into 10 raise to power -2 and 4 into 10 raise to power -2 respectively are joined in series with the main supply line of water .the velocity of water flowing in pipe p is ?

Solution:

According to the law of continuity,

$$v_1 S_1 = v_2 S_2.$$

Cross-section area of the pipes p and q are

$$S_1 = \frac{\pi d_1^2}{4}, \qquad S_2 = \frac{\pi d_2^2}{4}$$

respectively. Thus

$$v_1 = \frac{v_2 S_2}{S_1} = \frac{v_2 d_2^2}{d_1^2} = v_2 \cdot \frac{4^2}{2^2} = 4v_2.$$

Answer:

The velocity of water in the pipe p is four times larger than the velocity of water in the pipe q.