

What is the velocity of the flow of water in leg B of the tee in Figure 1

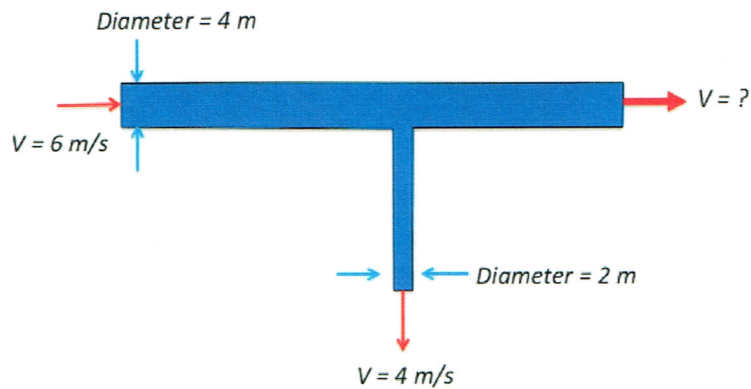
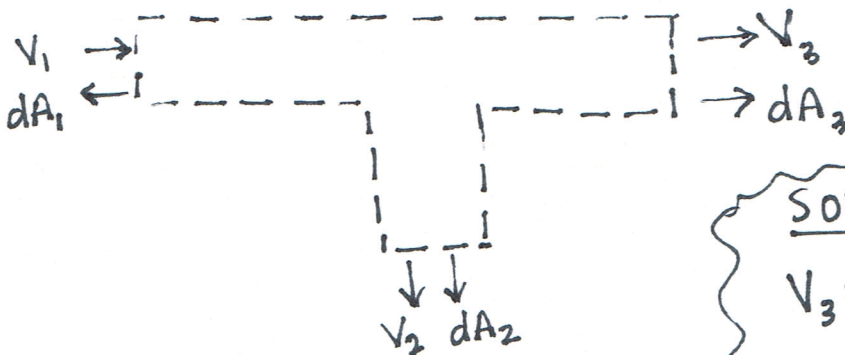


Figure 1: Water flow in T-connection

SKETCH:



GOVERNING EQN:

$$V_3 = \frac{V_1 A_1 - V_2 A_2}{A_3}$$

$$0 = \int_{c.s.} \rho V \cdot dA = -V_1 A_1 + V_2 A_2 + V_3 A_3$$

REVISION A

UNKNOWN: $V_3 ?$

SOLUTION:

$$V_3 = \frac{(6 \frac{m}{s}) \frac{\pi (4m)^2}{4} - (4m/s) \frac{\pi (2m)^2}{4}}{\frac{\pi (4m)^2}{4}}$$

$$= \frac{6 \cdot 4^2 - 4 \cdot 2^2}{4^2} = \frac{6 \cdot 4^2 - 4^2}{4^2}$$

$$V_3 = 5m/s$$