

- 3 A jet of water hits a vertical wall at right angles, as shown in Fig. 3.1.

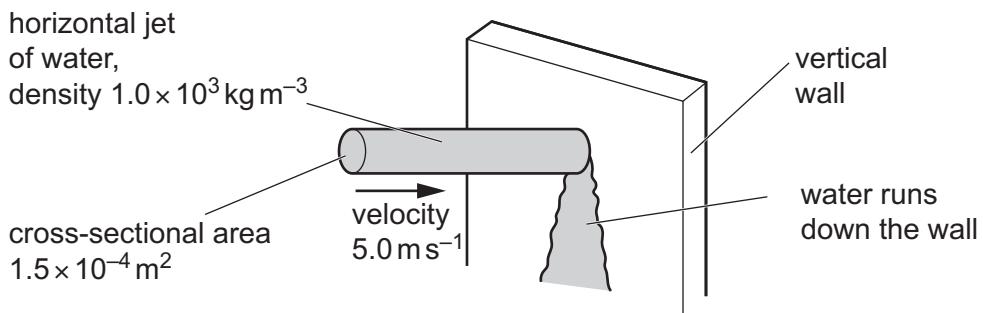


Fig. 3.1 (not to scale)

The water hits the vertical wall with a velocity of 5.0 ms^{-1} in a horizontal direction. The cross-sectional area of the jet is $1.5 \times 10^{-4} \text{ m}^2$. The density of the water is $1.0 \times 10^3 \text{ kg m}^{-3}$.

The water runs down the wall after hitting it.

- (a) Show that, over a time of 1.6 s, the mass of water hitting the wall is 1.2 kg.

[2]

- (b) Calculate:

- (i) the decrease in the horizontal momentum of the mass of water in (a) due to hitting the wall

$$\text{decrease in momentum} = \dots \text{Ns} \quad [1]$$

- (ii) the magnitude of the horizontal force exerted on the water by the wall.

$$\text{force} = \dots \text{N} \quad [1]$$

- (c) State and explain the magnitude of the horizontal force exerted on the wall by the water.

..... [1]

- (d) Calculate the pressure exerted on the wall by the water.

pressure = Pa [2]