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

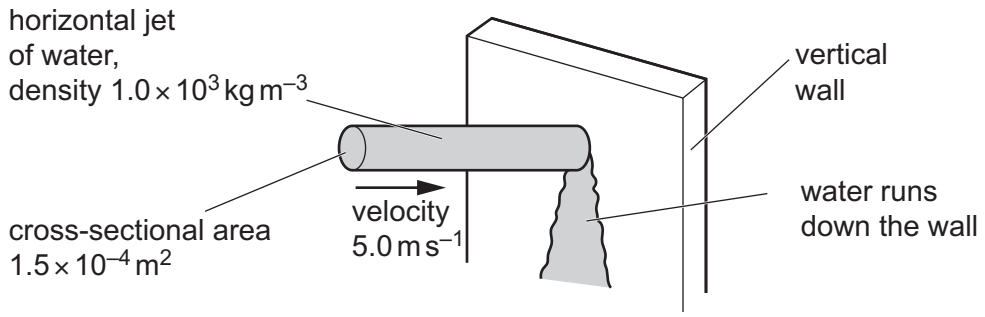

Fig. 3.1 (not to scale)

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

decrease in momentum = ... N s [1]

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

force = ... N [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]

[Total: 7]