

- 2 Water leaves the end of a hose pipe at point P with a horizontal velocity of  $6.6 \text{ m s}^{-1}$ , as shown in Fig. 2.1.

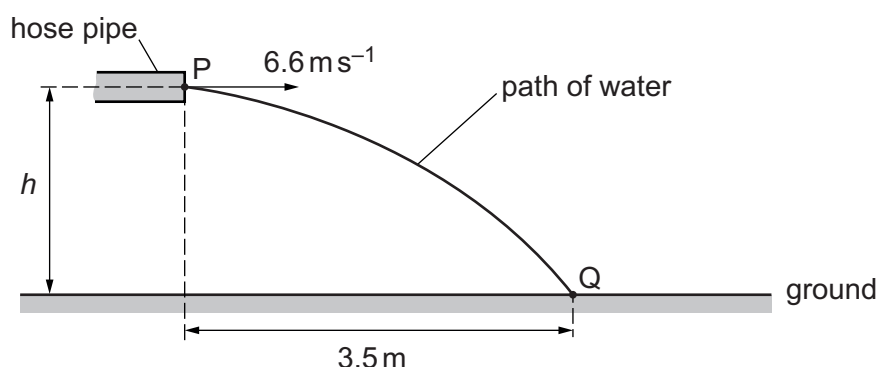


Fig. 2.1 (not to scale)

Point P is at height  $h$  above the ground. The water hits the ground at point Q. The horizontal distance from P to Q is  $3.5 \text{ m}$ .

Air resistance is negligible. Assume that the water between P and Q consists of non-interacting droplets of water and that the only force acting on each droplet is its weight.

- (a) Explain, briefly, why the horizontal component of the velocity of a droplet of water remains constant as it moves from P to Q.

.....  
..... [1]

- (b) Show that the time taken for a droplet of water to move from P to Q is  $0.53 \text{ s}$ .

[1]

- (c) Calculate height  $h$ .

$h = \dots\dots\dots \text{ m}$  [2]

- (d) For the movement of a droplet of water from P to Q, state and explain whether the displacement of the droplet is less than, more than or the same as the distance along its path.

.....  
.....  
..... [1]

- (e) Calculate the magnitude of the displacement of a droplet of water that moves from P to Q.

displacement = ..... m [2]

[Total: 7]