2 **(a)** Explain what is meant by a *scalar* quantity and by a *vector* quantity.

scalar: .....

.....

vector: .....

.....

[2]

(b) A ball leaves point P at the top of a cliff with a horizontal velocity of $15\,m\,s^{-1}$, as shown in Fig. 2.1.

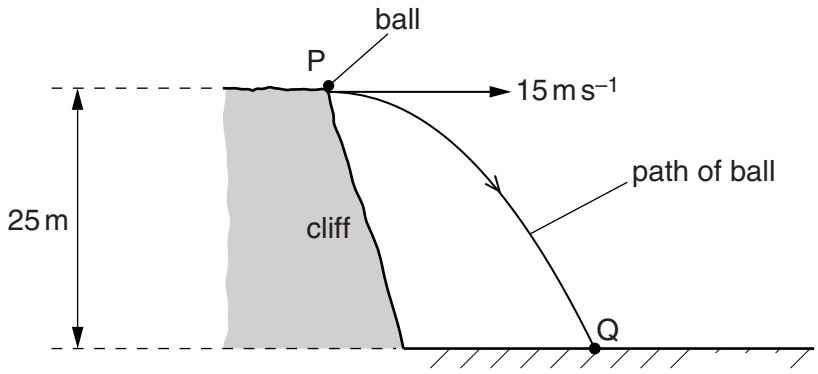

Fig. 2.1

The height of the cliff is 25 m. The ball hits the ground at point Q.
Air resistance is negligible.

(i) Calculate the vertical velocity of the ball just before it makes impact with the ground at Q.

vertical velocity = ... $m\,s^{-1}$ [2]

(ii) Show that the time taken for the ball to fall to the ground is 2.3 s.

[1]

(iii) Calculate the magnitude of the displacement of the ball at point Q from point P.

displacement = ... m [4]

(iv) Explain why the distance travelled by the ball is different from the magnitude of the displacement of the ball.

.....

.....

.....[2]