

- 1 (a) Two of the SI base quantities are mass and time. State three other SI base quantities.

1.

2.

3.

[3]

- (b) A sphere of radius r is moving at speed v through air of density ρ . The resistive force F acting on the sphere is given by the expression

$$F = Br^2\rho v^k$$

where B and k are constants without units.

- (i) State the SI base units of F , ρ and v .

F

ρ

v

[3]

- (ii) base units to determine the value of k .

$k =$ [2]

(iii) determine the horizontal distance x .

$x = \dots\dots\dots$ m [2]

(b) The path of the ball in (a), with an initial horizontal speed of 8.2 m s^{-1} , is shown again in Fig. 2.2.

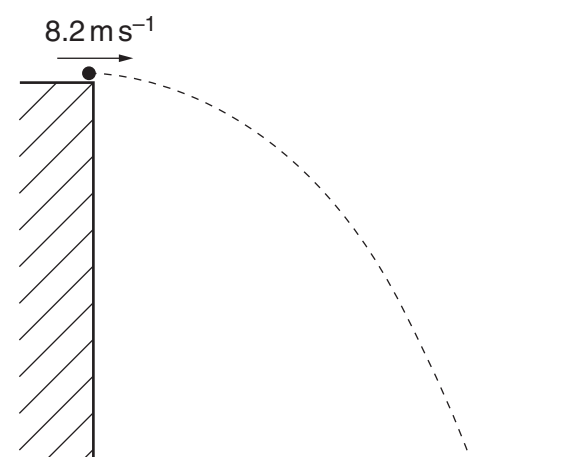


Fig. 2.2

On Fig. 2.2, sketch the new path of the ball for the ball having an initial horizontal speed

- (i) greater than 8.2 m s^{-1} and with negligible air resistance (label this path G), [2]
- (ii) equal to 8.2 m s^{-1} but with air resistance (label this path A). [2]