

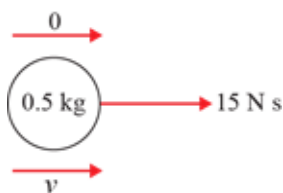
Exercise 6A

1 (→):

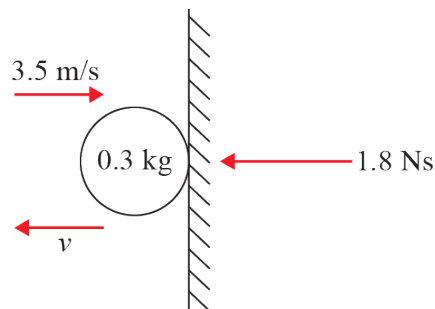
$$15 = 0.5v$$

$$30 = v$$

Its initial speed is 30 m s^{-1}



2



(←):

$$I = mv - mu$$

$$1.8 = (0.3 \times v) - (0.3 \times (-3.5))$$

$$1.8 = 0.3v + 1.05$$

$$0.75 = 0.3v$$

$$v = 2.5 \text{ m s}^{-1}$$

The speed of the ball just after it rebounds is 2.5 m s^{-1}

3 $Ft = mv - mu$

$$0.4 \times 1.5 = 0.2(v - 0)$$

$$0.6 = 0.2v$$

$$3 = v$$

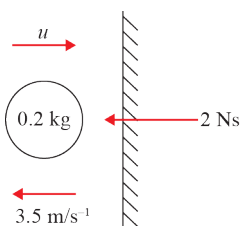
The speed of the toy car is 3 m s^{-1}

4 (←):

$$2 = 0.2(3.5 - (-u))$$

$$10 = 3.5 + u$$

$$u = 6.5$$



The speed of the ball before it hits the wall is 6.5 m s^{-1}

Mechanics 1

Solution Bank

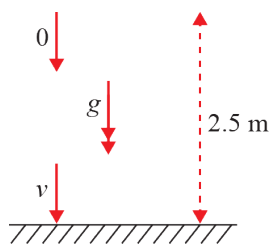
5 $u = 0, a = g, s = 2.5, v = ?$

$$(\downarrow): v^2 = u^2 + 2as$$

$$v^2 = 0^2 + 2 \times 9.8 \times 2.5$$

$$= 49$$

$$v = 7$$



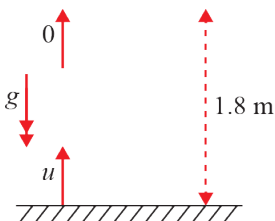
(\uparrow): $v = 0, a = -g, s = 1.8, u = ?$

$$v^2 = u^2 + 2as$$

$$0^2 = u^2 + 2(-9.8) \times 1.8$$

$$u^2 = 35.28$$

$$u = 5.94$$



Take upwards as positive.

(\uparrow): $I = 0.2(5.94 - (-7))$

$$= 2.588$$

The magnitude of the impulse received by the ball is 2.59 N s (2 d.p.)

