## Chapter 2 Exercise 2A

**Q. 1.** (i) $u = 0, \quad v = 10, \quad t = 5, \quad a = ?$

$$v = u + at$$
$$10 = 0 + 5a$$
$$a = 2 \text{ m/s}^2$$

(ii) $u = 0, \quad a = 2, \quad t = 5, \quad s = ?$

$$s = ut + \frac{1}{2}at^2$$
$$s = (0)(5) + \frac{1}{2}(2)(25)$$
$$= 25 \text{ m}$$

**Q. 2.** (i) $u = 0, \quad v = 24, \quad a = 3, \quad t = ?$

$$v = u + at$$
$$24 = 0 + 3t$$
$$t = 8 \text{ s}$$

(ii) $u = 0, \quad a = 3, \quad t = 8, \quad s = ?$

$$s = ut + \frac{1}{2}at^2$$
$$s = (0)(8) + \frac{1}{2}(3)(64) = 96 \text{ m}$$

**Q. 3.** $u = 0, \quad a = 3, \quad s = 6, \quad v = ?$

$$v^2 = u^2 + 2as$$
$$v^2 = 0 + 2(3)(6)$$
$$v = 6 \text{ m/s}$$

**Q. 4.** $u = 50, \quad v = 70, \quad s = 300, \quad a = ?$

$$v^2 = u^2 + 2as$$
$$4{,}900 = 2{,}500 + 2(a)(300)$$
$$a = 4 \text{ m/s}^2$$

$u = 50, \quad v = 70, \quad a = 4, \quad t = ?$

$$v = u + at$$
$$70 = 50 + 4t$$
$$t = 5 \text{ s}$$

**Q. 5.** $a = 0.5, \quad s = 600, \quad t = 40, \quad u = ?$

$$s = ut + \frac{1}{2}at^2$$
$$600 = u(40) + \frac{1}{2}(0.5)(1{,}600)$$
$$600 = 40u + 400$$
$$200 = 40u$$
$$u = 5 \text{ m/s}$$

**Q. 6.** $u = 3, \quad v = 11, \quad t = 6, \quad s = ?$

$$s = \left(\frac{u + v}{2}\right)t$$
$$s = \left(\frac{3 + 11}{2}\right)(6)$$
$$= 42 \text{ m}$$

**Q. 7.** $u = 3, \quad v = 0, \quad s = 6, \quad a = ?$

$$v^2 = u^2 + 2as$$
$$0 = 9 + 2a(6)$$
$$a = -\frac{3}{4} \text{ m/s}^2$$

$u = 3, \quad v = 0, \quad a = -\frac{3}{4}, \quad t = ?$

$$v = u + at$$
$$0 = 3 + -\left(\frac{3}{4}\right)t$$
$$t = 4 \text{ s}$$

**Q. 8.** (i) $u = 70, \quad v = 50, \quad t = 8, \quad a = ?$

$$v = u + at$$
$$70 = 50 + a(8)$$
$$a = -2\frac{1}{2} \text{ m/s}^2$$

$u = 70, \quad t = 8, \quad a = -2\frac{1}{2}, \quad s = ?$

$$s = ut + \frac{1}{2}at^2$$
$$s = 70(8) + \frac{1}{2}\left(-2\frac{1}{2}\right)(64)$$
$$= 560 - 80 = 480 \text{ s}$$

(ii) $u = 50, \quad v = 0, \quad a = -2\frac{1}{2}, \quad s = ?$

$$v^2 = u^2 + 2as$$
$$0 = 2{,}500 - 5s$$
$$s = 500 \text{ m}$$

**Q. 9.** (i) $u = 24, \quad v = 0, \quad a = -8, \quad s = ?$

$$v^2 = u^2 + 2as$$
$$0 = 576 + 2(-8)s$$
$$s = 36 \text{ m}$$

(ii) $v^2 = u^2 + 2as$

$$0 = 2{,}304 + 2(-8)s$$
$$s = 144 \text{ m}$$

**Q. 10.** (i) $72 \text{ km/hr} = \frac{72{,}000 \text{ m}}{3{,}600 \text{ s}}$

$$= 20 \text{ m/s}$$

(ii) $48 \text{ km/hr} = \frac{48{,}000 \text{ m}}{3{,}600 \text{ s}} = \frac{40}{3} \text{ m/s}$

$$v^2 = u^2 + 2as$$
$$\frac{1{,}600}{9} = 400 + 2a(500)$$
$$a = -\frac{2}{9} \text{ m/s}^2$$
$$v = u + at$$
$$\frac{40}{3} = 20 + \left(-\frac{2}{9}\right)t$$
$$t = 30 \text{ s}$$