

Chapter 2 Exercise 2A

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\begin{aligned} v^2 &= u^2 + 2as \\ \frac{1,600}{9} &= 400 + 2a(500) \\ a &= -\frac{2}{9} \text{ m/s}^2 \end{aligned}$$

$$\begin{aligned} v &= u + at \\ \frac{40}{3} &= 20 + \left(-\frac{2}{9}\right)t \\ t &= 30 \text{ s} \end{aligned}$$