

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

$$0 = \frac{1,600}{9} + 2\left(-\frac{2}{9}\right)s$$

$$s = 400 \text{ m}$$

Q. 11. (i) $1 \text{ km/hr} = \frac{1,000 \text{ m}}{3,600 \text{ s}} = \frac{5}{18} \text{ m/s}$

$$\therefore 72 \text{ km/hr} = 20 \text{ m/s and}$$

$$54 \text{ km/hr} = 15 \text{ m/s}$$

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

$$225 = 400 + 2(a)(35)$$

$$a = -2\frac{1}{2} \text{ m/s}^2$$

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

$$0 = 225 + 2\left(-2\frac{1}{2}\right)s$$

$$s = 45 \text{ m}$$

Q. 12. Let t be the time of meeting.

$$s_1 = 5t + \frac{1}{2}(3)t^2 = 5t + \frac{3}{2}t^2$$

$$s_2 = 7t + \frac{1}{2}(2)t^2 = 7t + t^2$$

$$s_1 + s_2 = 162$$

$$12t + \frac{5}{2}t^2 = 162$$

$$t = 6 \left(t = -\frac{54}{5} \text{ rejected} \right)$$

At $t = 6$,

$$v_1 = u + at = 5 + (3)(6)$$

$$= 23 \text{ m/s}$$

$$v_2 = 7 + (2)(6)$$

$$= 19 \text{ m/s}$$

Q. 13. (i) They will meet when $s_1 + s_2 = 400$.

$$\therefore 3t + \frac{1}{2}(4)t^2 + 7t + \frac{1}{2}(2)t^2 = 400$$

$$\therefore 10t + 3t^2 = 400$$

$$\therefore 3t^2 + 10t - 400 = 0$$

$$\therefore (3t + 40)(t - 10) = 0$$

$$\therefore t = -\frac{40}{3} \quad \text{OR} \quad t = 10$$

$$\therefore t = 10 \text{ s}$$

$$(t = -\frac{40}{3} \text{ is rejected as impossible})$$

(ii) $s_1 = 3(10) + \frac{1}{2}(4)(10)^2 = 230 \text{ m}$

$$s_2 = 7(10) + \frac{1}{2}(2)(10)^2 = 170 \text{ m}$$

Q. 14. (i) $30 \text{ km/hr} = \frac{30,000 \text{ m}}{3,600 \text{ s}} = \frac{25}{3} \text{ m/s}$

$$v = u + at$$

$$\frac{25}{3} = 0 + 2t$$

$$t = 4\frac{1}{6} \text{ s}$$

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

$$\left(\frac{50}{3}\right)^2 = 0^2 + 2(2)s$$

$$s = \frac{625}{9} \text{ m}$$

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

$$0^2 = \left(\frac{50}{3}\right)^2 + 2(a)(2)$$

$$a = -\frac{625}{9} \text{ m/s}^2$$

Exercise 2B

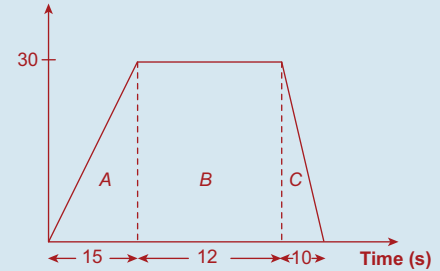
Q. 1. (i) $u = 0, \quad a = 2, \quad v = 30$

$$v = u + at$$

$$30 = 0 + 2t$$

$$t = 15 \text{ s}$$

(ii) **Speed (m/s)**



Total distance covered = Area under graph

$$= A + B + C$$

$$= \frac{1}{2}(15)(30) + (12)(30) + \frac{1}{2}(10)(30)$$

$$= 225 + 360 + 150$$

$$= 735 \text{ m}$$

(iii) $u = 30, \quad v = 0, \quad t = 10$

$$v = u + at$$

$$0 = 30 + 10a$$

$$10a = -30$$

$$a = -3 \text{ m/s}^2$$

Magnitude of deceleration is 3 m/s^2

Q. 2. (i) $v = u + at$

$$20 = 0 + a(5)$$

$$a = 4 \text{ m/s}^2$$