(ii) First part: $a = ut + \frac{1}{2}at^2$

$= 0(12) + \frac{1}{2}(2)(12)^2$

$= 144$ m

$\therefore$ Total distance $= 144 + 48 = 192$ m

Total time $= 12 + 4 = 16$ s

$\therefore$ Average speed $= \frac{192}{16} = 12$ m/s

Q. 4. $s_1 = ut + \frac{1}{2}at^2 = 0(t) + \frac{1}{2}(4)t^2 = 2t^2$

$s_2 = 20t$

$s_1 = s_2$

$2t^2 = 20t$

$t = 10$ s

$s = 200$ m

Q. 5. (i) $v_1 = 10 + 3t$; $v_2 = 20 + 2t$

(ii) $s_1 = 10t + \frac{3}{2}t^2$; $s_2 = 20t + t^2$

(iii) $v_1 = v_2$

$10 + 3t = 20 + 2t$

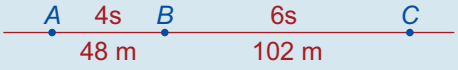
$t = 10$ s

(iv) $s_1 = s_2$

$10t + \frac{3}{2}t^2 = 20t + t^2$

$t = 0$ **OR** $t = 20$ s

Q. 6.



A to B: $u = u$, $t = 4$, $s = 48$, $a = a$

$s = ut + \frac{1}{2}at^2$

$48 = 4u + 8a$

$u + 2a = 12$

A to C: $u = u$, $t = 10$, $s = 150$, $a = a$

$s = ut + \frac{1}{2}at^2$

$150 = 10u + 50a$

$u + 5a = 15$

Solving gives $a = 1$, $u = 10$

Answer: 1 m/s^2

Q. 7. (i) $s = ut + \frac{1}{2}at^2$

$18 = u(2) + \frac{1}{2}(a)(4)$

$u + a = 9$ (1st part)

$s = ut + \frac{1}{2}at^2$

$48 = u(4) + \frac{1}{2}(a)(16)$

$u + 2a = 12$ (1st and 2nd parts)

Solving these gives (i) $a = 3$ m/s^2

(ii) $u = 6$ m/s

(iii) First 6 seconds:

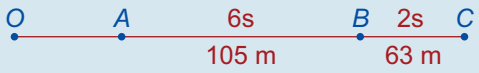
$s = ut + \frac{1}{2}at^2$

$s = (6)(6) + \frac{1}{2}(3)(36) = 90$ m

The distance travelled $= 90 - 48$

$= 42$ m

Q. 8.



(i) A to B: $u = u$, $s = 105$, $t = 6$, $a = a$

$s = ut + \frac{1}{2}at^2$

$105 = 6u + 18a$

A to C: $u = u$, $s = 168$, $t = 8$, $a = a$

$s = ut + \frac{1}{2}at^2$

$168 = 8a + 32a$

Solving gives $a = 3.5$, $u = 7$

Answer: $a = 3.5$ m/s

(ii) O to A: $u = 0$, $v = 7$, $a = 3.5$, $s = s$

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

$49 = 0 + 7s$

$s = 7$ m

Q. 9. 1st part: $s = ut + \frac{1}{2}at^2$

$39 = u(1) + \frac{1}{2}a(1)^2$

$2u + a = 78$

1st and 2nd parts: $76 = u(2) + \frac{1}{2}a(2)^2$

$2u + 2a = 76$

First three parts: $111 = u(3) + \frac{1}{2}a(3)^2$

$6u + 9a = 222$

$u + 3a = 74$

Solving the first two equations gives $a = -2$, $u = 40$

Solving the last two equations gives $a = -2$, $u = 40$

$\therefore$ They are consistent.