Exercise 1C

(2) $u = 20\ m\,s^{-1}$
$v = 55\ m\,s^{-1}$
$s = 1500\ m$

$s = \frac{1}{2}(u+v)t$
$\therefore 1500 = \frac{1}{2}(20+55)t$

$\therefore t = 40\ s$

$v = u + at$
$55 = 20 + a(40)$

$\therefore a = 0{,}875\ m\,s^{-2}$

(4) $u = 5\ m\,s^{-1}$
$v = 7\ m\,s^{-1}$
$s = 200\ m$

$v^2 = u^2 + 2as$
$7^2 = 5^2 + 2 \cdot a \cdot 200$
$\therefore a = 0{,}06\ m\,s^{-2}$

(6) $u = 3\ m\,s^{-1}$
$a = 0{,}04\ m\,s^{-2}$
$v = 15\ m\,s^{-1}$

(a) $v^2 = u^2 + 2as$
$15^2 = 3^2 + 2(0{,}04)s$
$\therefore s = 2700\ m = 2{,}7\ km$

(b) $s = ut + \frac{1}{2}at^2$
$2000 = 3t + \frac{1}{2}(0{,}04)t^2$

$\therefore 0{,}02t^2 + 3t - 2000 = 0$

$\therefore t = \frac{-3 + \sqrt{3^2 + 4(0{,}02)(2000)}}{2(0{,}02)}$

$\therefore t = 250\ s$

(7) $u = 30 \text{ m s}^{-1}$

$a = -10 \text{ m s}^{-2}$

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

$\therefore v = \sqrt{30^2 + 2(-10)s} = \sqrt{900 - 20s}$

(b) $s = 40 \text{ m}$

$\therefore v = \sqrt{900 - 20(40)}$

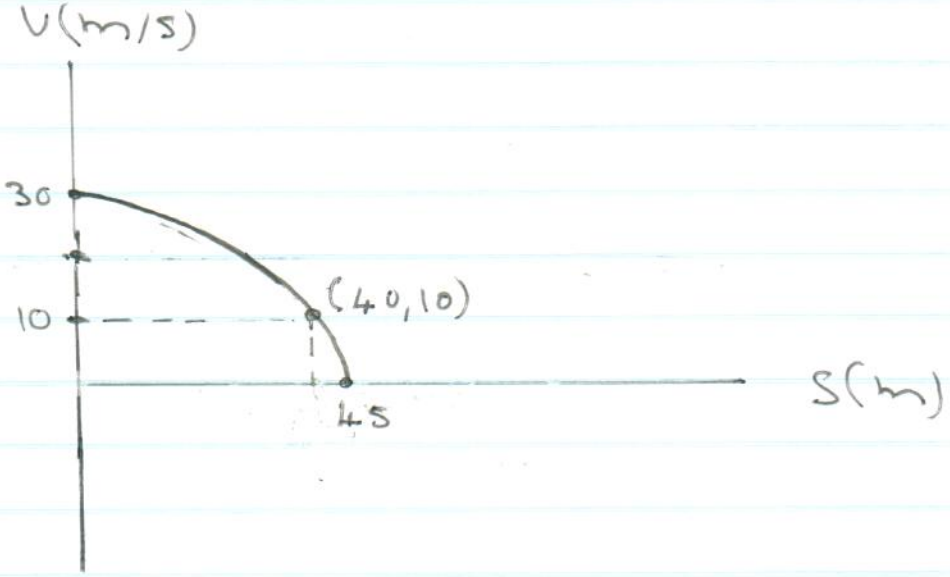
$\therefore v = 10 \text{ m s}^{-1}$

(c) $0 = \sqrt{900 - 20s}$

$\therefore s = \frac{900}{20} = 45 \text{ m}$

$\therefore$ Distance from barrier $= 50 - 45 = 5 \text{ m}$

(d)



(10) $u = 10\ m\ s^{-1}$

$s = 25\ m$

$t = 2\ s$

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

$\therefore 25 = 10(2) + \frac{1}{2}a(2)^2$

$\therefore a = 2,5\ m\ s^{-2}$

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

$\therefore 0 = 10^2 + 2a \cdot 25$

$\therefore a = -2\ m\ s^{-2}$