

Exercise 6A

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

$$\therefore 14,7 = u(1,4) + \frac{1}{2} 10 (1,4)^2$$

$$\therefore u = 3,5 \text{ m s}^{-1}$$

$$\therefore v = u + at$$

$$= 3,5 + 10(1,4)$$

$$\therefore v = 17,5 \text{ m s}^{-1}$$

Exercice 6B

$$(15) \quad u = 25 \text{ m s}^{-1} \quad s_0 = 30 \text{ m}$$

$$(a) \quad v^2 = u^2 + 2as: \quad 0 = 25^2 - 2(10)s$$

$$\therefore s = 31,25 \text{ m}$$

$$\therefore h = s_0 + s = 61,25 \text{ m}$$

$$(b) \quad s = ut + \frac{1}{2}at^2 \\ -30 = 25t + 5t^2$$

$$\therefore 5t^2 - 25t - 30 = 0$$

$$(t+1)(5t-30) = 0$$

$$\therefore t = -1 \text{ s} \quad \text{ou} \quad t = 6 \text{ s}$$

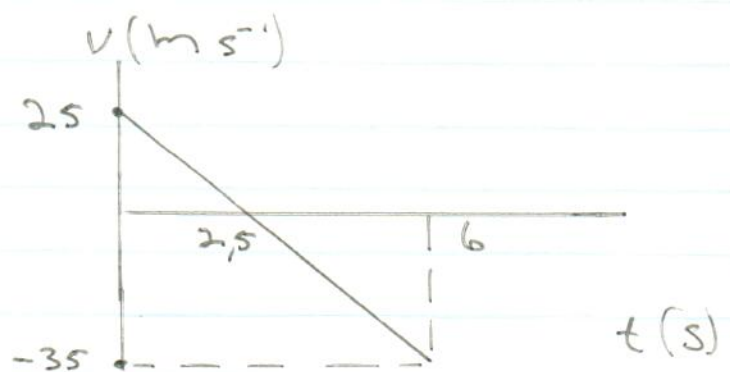
$$\therefore t = 6 \text{ s}$$

$$(c) \quad v = u + at$$

$$v = 25 - 10t$$

$$t = 6 \text{ s}: v = -35 \text{ m s}^{-1}$$

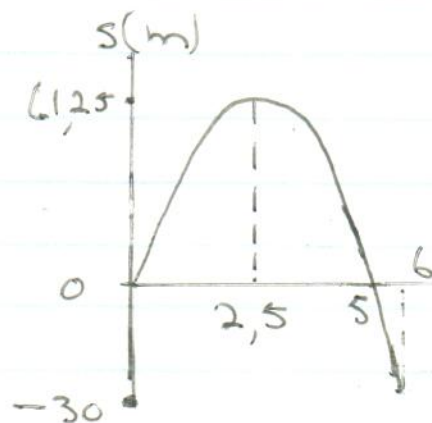
$$v = 0: t = 2,5 \text{ s}$$



$$(d) \quad s = 25t - 5t^2$$

$$s = 0: t = 0; t = 5 \text{ s}$$

$$s = 61,25 \text{ m}: t = 2,5 \text{ s} \\ (v = 0)$$



Exercise 6C

$$(4) \quad s = ut + \frac{1}{2}at^2$$

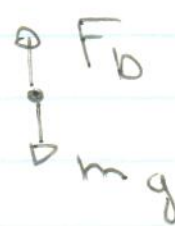
$$(a) + (b) \quad s = 0 + \frac{1}{2}10(3)^2$$

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

(b) Both will be smaller

$$(c) + (1) \quad \sum F_y = ma = 0$$

(At terminal vel)


$$\therefore F_b - mg = 0$$

$$kv = mg$$

$$\therefore k = \frac{mg}{v} = \frac{2,5(10)}{50} = 0,5$$

$$+ (1) \quad \sum F = ma$$

$$\therefore F_b - mg = ma$$

$$\therefore 0,5(10) - 2,5(10) = 2,5 a$$

$$\therefore a = -8 \text{ m s}^{-2}$$

$$\therefore a = 8 \text{ m s}^{-2} \downarrow$$

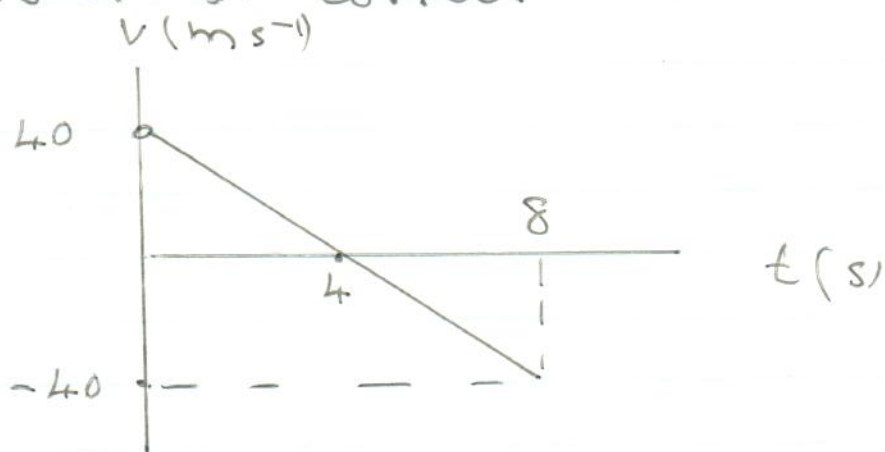
Miscellaneous exercise 6

$$(5) \quad v = u + at$$
$$0 = u - 10(4)$$

$$\therefore u = 40 \text{ m s}^{-1}$$

(a) Not a constant acceleration

(b) Neither is correct



$$v = 40 - 10t$$

(7) Assume depth = h

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

$$h = 0 + \frac{1}{2} 10 t_1^2 \quad - \textcircled{1}$$

where $t_1 \equiv$ time to reach bottom

$$\text{Further: } h = 350 (7.7 - t_1) \quad - \textcircled{2}$$

$$\text{Sub } \textcircled{2} \text{ into } \textcircled{1}: 2695 - 350t_1 = 5t_1^2$$

$$\therefore t_1^2 + 70t_1 - 539 = 0$$

$$\therefore t_1 = \frac{-70 \pm \sqrt{70^2 - 4(1)(-539)}}{2}$$

$$t_1 = 7 \text{ s}$$

$$\therefore \text{ From } \textcircled{1}: h = 245 \text{ m}$$