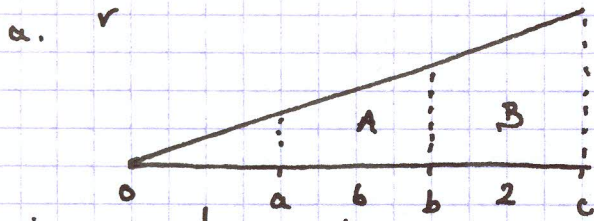


TEST - 1996 Paper Question one.



i.

$u=0$	$u=u$	$u=u$
$v=v$	v	v
$a=a$	$a=a$	$a=a$
$s=a-b$	$s=105$	$s=168$
$t=b$	$t=6$	$t=8$

do not consider

This part of journey - not enough info.

NB

we can make up 2 equations with 2 unknowns which are the same.

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

$$105 = 6u + \frac{1}{2} \cdot a \cdot (6)^2 \quad 105 = 6u + 18a \quad (10)$$

$$168 = 8u + \frac{1}{2} \cdot a \cdot (8)^2 \quad 168 = 8u + 32a \quad (10)$$

solving simultaneous equations

$$u = 7$$

$$a = 3.5$$

(5)

ii. 1st part:

$$u=0 \quad v^2 = u^2 + 2as$$

$$v=7 \quad \frac{v^2 - u^2}{2a} = s$$

$$a=3.5$$

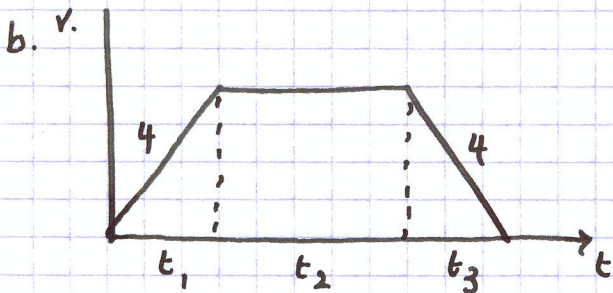
$$s =$$

$$t =$$

$$s = \frac{7^2}{2(3.5)}$$

$$s = 7$$

(5)



ii. Examine the question carefully before you begin. You are looking for t_2 and must have t and d in your equation

⇒ try and put everything else in terms of these.

(5)

a. SORT OUT those t 's!

$$t = t_1 + t_2 + t_3 \quad \text{but} \quad t_1 = t_3 \quad (\text{same rate of acceleration/deceleration})$$

$$\Rightarrow t = 2t_1 + t_2$$

$$\Rightarrow \frac{t - t_2}{2} = t_1$$

b. equation in d : $d = \frac{1}{2} \cdot t_1 \cdot v + t_2 \cdot v + \frac{1}{2} t_3 \cdot v$

c. car replace t_1/t_3 ; need to replace v .

acceleration

$$u=0$$

$$v=4$$

$$a=4$$

$$s$$

$$t_1 = \frac{t - t_2}{2}$$

$$v = 0 + 4 \cdot \left(\frac{t - t_2}{2} \right)$$

$$v = 2(t - t_2)$$

d) $\Rightarrow d = \frac{1}{2} \cdot \left(\frac{t - t_2}{2} \right) \cdot (t - t_2) + 2t_2(t - t_2) + \frac{1}{2} \left(\frac{t - t_2}{2} \right) \cdot (t - t_2)$

$$d = (t - t_2)(t - t_2) + 2t_2(t - t_2)$$

$$= (t - t_2)(t - t_2 + 2t_2)$$

$$= (t - t_2)(t + t_2)$$

$$d = t^2 - t_2^2$$

$$\Rightarrow t_2 = \sqrt{t^2 - d}$$