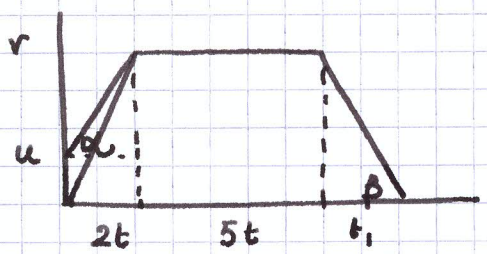
1999
Q1 b.

i.



u	u	v	v
v	v	v	0
a	f	0	3f
s	15	55	?
t	2t	5t	P

$55 = 5tv$

$11 = tv$

$v = \frac{11}{t}$

ii. $15 = 2tu + \frac{1}{2}\cdot 2t(v-u)$

$15 = 2tu + tv - tu$

$4 = tu$

$u = \frac{4}{t}$

iii. Try all methods, you can't solve this using usual methods. (need to find t_1 in terms of t)
However the acceleration is represented by the slope (tan) of the angle!

$\therefore \quad \tan\beta = 3\tan\alpha$ (acceleration f, deceleration $3f$)

$$\frac{v}{t_1} = \frac{3(v-u)}{2t}$$

$$\therefore \quad t_1 = \frac{2tv}{3(v-u)}$$ get rid of v & u

$$\frac{2.11}{3\left(\frac{11}{t} - \frac{4}{t}\right)} = \frac{22t}{21}$$

v from above.

$\therefore$ total distance $= 15 + 55 + \frac{1}{2}\left(\frac{22t}{21}\right)\left(\frac{11}{t}\right)$

$= 75.76$ m.

This question was determined to be 'extremely difficult' by the chief examiners report – no one got it fully correct.