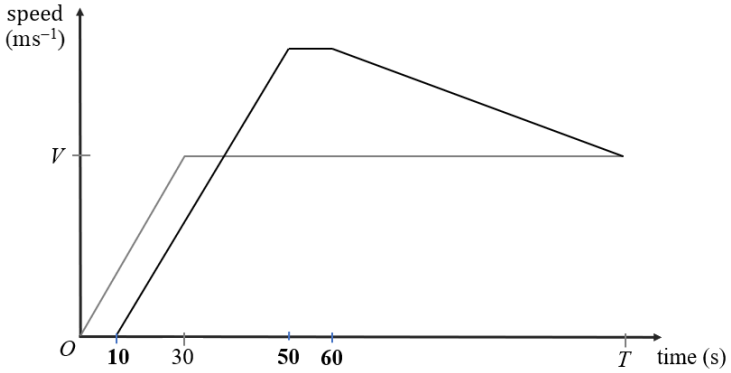
Question number	Scheme	Marks
5(a)	For car: $\left(\frac{T+T-30}{2}\right)V$	M1
	$V(T-15)$ (metres) * Allow $(T-15)V$	A1*
		(2)
5(b)		B1 shape B1 Horiz labels (10,50,60)
		(2)
5(c)	$\frac{speed}{40}=\frac{V}{30}$	M1
	$(\text{speed})=\frac{4V}{3}$ (m s^{-1})*	A1*
		(2)
5(d)	For motorbike **OR:** $\frac{1}{2}\left(\frac{4V}{3}\times 40\right)+\left(\frac{4V}{3}\times 10\right)+\frac{1}{2}\left(\frac{4V}{3}+V\right)(T-60)$ **OR:** $\frac{1}{2}\left(\frac{4V}{3}\times 40\right)+\left(\frac{4V}{3}\times 10\right)+\frac{1}{2}\left(\frac{4V}{3}-V\right)(T-60)+V(T-60)$ **OR:** $\frac{1}{2}\times\frac{4V}{3}\times(10+50)+\frac{1}{2}\left(\frac{4V}{3}+V\right)(T-60)$ (Simplified: $\frac{7VT}{6}-30V$)	M1 A1 A1
	Equate their motorbike distance to $V(T-15)$ to give an equation in T only	M1
	$T=90$	A1
	ALT: Find area of upper trapezium **and** parallelogram (differences in areas) $\frac{1}{2}\left(\frac{V}{3}\right)(T-40+10)$ **and** $10V$	M1 A1 A1
	Equate to give an equation in T only (V cancels)	M1
	$T=90$	A1
		(5)
		(11)

Notes for Question 5	
(a)	
M1	Uses total area under graph to find an expression for the distance in terms of V and T only May use: Trapezium: $\left(\frac{T+T-30}{2}\right)V$ triangle + rectangle : $\frac{1}{2}(30V)+V(T-30)$ a triangle subtracted from a rectangle: $VT-\frac{1}{2}(30\times V)$ **OR** use of *suvat*: $\frac{1}{2}(30V)+V(T-30)$
A1*	Given answer correctly obtained (allow omission of 'metres'.
(b)	
	N.B. If graph is not done on either of the given graphs on the question paper, they score B0B0 .
B1	Correct shape with acceleration lines parallel and meeting at (T, V) B0 if continuous vertical line at $t = T$
B1	Correct horizontal labels. Accept appropriately labelled delineators. **N.B.** This mark is independent of the first B1.
(c)	
M1	Correct method using gradients or *suvat* to obtain an equation in V only
A1*	Given answer correctly obtained
(d)	
M1	For motorbike: find an expression for the **TOTAL** area under the graph (or use *suvat*) to find the total distance travelled in terms of V and T only. **N.B.** $\frac{1}{2}\left(\frac{4V}{3}\times 40\right)+\left(\frac{4V}{3}\times 10\right)+\frac{1}{2}\left(\frac{4V}{3}-V\right)(T-60)$ is M0 as it omits a part of the area.
A1	Correct unsimplified expression with at most one error/slip
A1	Correct unsimplified expression
M1	Clear attempt to equate their distance to the given distance in part (a) to give an equation in T only i.e. the V's **must** cancel but they do not need to be cancelled for this mark. **N.B.** This is an independent mark.
A1	cao