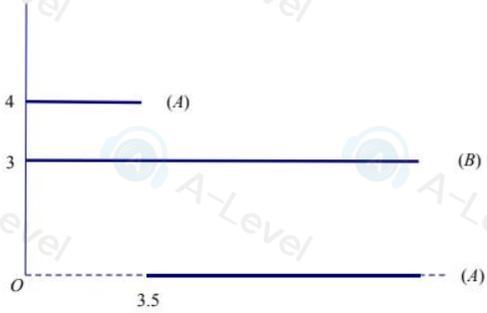
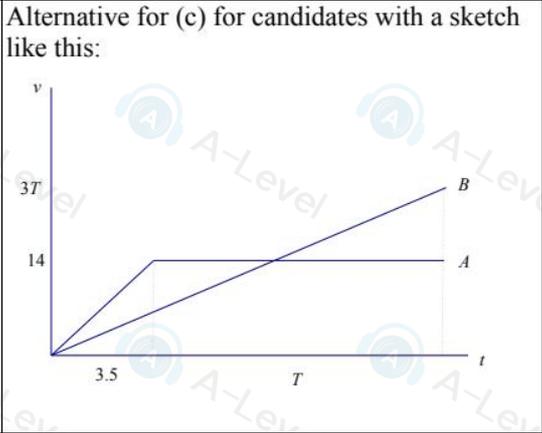
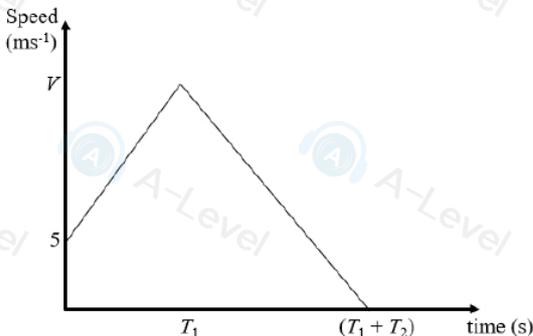


Question Number	Scheme	Marks	Notes
6.(a)	$v = u + at \Rightarrow 14 = 3.5a$	M1	Use of <i>suvat</i> to form an equation in <i>a</i>
	$a = 4$	A1(2)	
6.(b)		B1	Graph for <i>A</i> or <i>B</i>
		B1	Second graph correct and both graphs extending beyond the point of intersection
		B1	Values 3.5, 14, <i>T</i> shown on axes, with <i>T</i> not at the point of intersection. Accept labels with delineators.
		(3)	NB 2 separate diagrams scores max B1B0B1
6.(c)	$\frac{1}{2}T \cdot 3T, \quad \frac{(T+T-3.5)}{2} \cdot 14$	M1	Find distance for <i>A</i> or <i>B</i> in terms of <i>T</i> only. Correct area formulae: must see $\frac{1}{2}$ in area formula and be adding in trapezium
		A1	One distance correct
		A1	Both distances correct
	$\frac{1}{2}T \cdot 3T = \frac{(T+T-3.5)}{2} \cdot 14$ $\frac{1}{2}T \cdot 3T = \frac{1}{2} \times 4 \times 3.5^2 + 14(T-3.5)$	M1	Equate distances and simplify to a 3 term quadratic in <i>T</i> in the form $aT^2 + bT + c = 0$
	$3T^2 - 28T + 49 = 0$	A1	Correct quadratic
	$(3T-7)(T-7) = 0$	M1	Solve 3 term quadratic for <i>T</i>
	$T = \frac{7}{3}$ or 7	A1	Correct solution(s) - can be implied if only ever see $T = 7$ from correct work.
	but $T > 3.5, T = 7$	A1 (8)	
6.(d)	73.5 m	B1 (1)	From correct work only. B0 if extra answers.
6.(e)		B1	(A) Condone missing 4
		B1	(B) Condone graph going beyond $T = 7$ Must go beyond 3.5. Condone no 3.
		B1 (3)	(A) Condone graph going beyond $T = 7$ Must go beyond 3.5. B0 if see a <u>solid</u> vertical line. Sometimes very difficult to see. If you think it is there, give the mark.
		[17]	Condone separate diagrams. See next page

<p>Alternative for (c) for candidates with a sketch like this:</p> 		<p>B1 B1 B0</p>	<p>Treat as a special case. B1B1B0 on the graph and then max 5/8 for (c) if they do not solve for the T in the question.</p>
	$\frac{1}{2} \times 3 \times (T + 3.5)^2 = \frac{1}{2} \times 4 \times 3.5^2 + 14T$	<p>M1</p>	<p>Use diagram to find area</p>
		<p>A1</p>	<p>One distance correct</p>
		<p>A1</p>	<p>Both distances correct</p>
	$12T^2 - 28T - 49 = 0$	<p>M1</p>	<p>Simplify to a 3 term quadratic in T</p>
		<p>A1</p>	<p>Correct quadratic</p>
	$(2T - 7)(6T + 7) = 0$	<p>M1</p>	<p>Complete method to solve for the T in the question</p>
	$T = \frac{7}{2} \text{ or } \frac{-7}{6}$	<p>A1</p>	<p>Correct solution(s) - can be implied if only ever see Total = 7</p>
	<p>Total time = 7</p>	<p>A1 (8)</p>	

QUESTION NUMBER	SCHEME	MARKS
2(a)		B1 shape B1 time labels B1 speed labels
		(3)
2(b)(i)	$132 = \frac{(5+V)T_1}{2}$ OR $132 = 5T_1 + \frac{1}{2}T_1(V-5)$	M1
	$T_1 = \frac{264}{5+V}$ oe	A1
2(b)(ii)	$136 = \frac{VT_2}{2}$	M1
	$T_2 = \frac{272}{V}$ oe	A1
		(4)
2(c)	$\frac{264}{5+V} + \frac{272}{V} = 28$	M1
	$(28V^2 - 396V - 1360 = 0$ OR $7V^2 - 96V - 340 = 0)$	
	$V = 17$ only	A1
		(2)
2(d)	Deceleration = $\frac{\text{their } V}{\text{their } T_2}$ OR $\frac{(\text{their } V)^2}{272}$	M1
	$\frac{17}{16}$ oe = 1.0625 Accept 1.1 or better (m s ⁻²)	A1
		(2)
		(11)
Notes for Question 2		
N.B. If you think a candidate has misread the question and consistently uses T_2 as the time from A to C, send to Review.		
Allow use of t_1 and t_2 instead of T_1 and T_2 throughout.		
2(a)		
B1	Correct graph shape. Must start on the vertical axis and not at the origin and finish on the t -axis. B0 if they have any extra continuous lines.	
B1	Correct time labels. Accept delineators (B0 if delineators missing)	

5(a)		B1	shape
		B1	rel grad - RHS steeper than LHS
		B1	17 and 170 shown
		(3)	
(b)	$T; 2T$	B1	Correct ratios of times for acceleration and deceleration seen or implied.
	$\frac{170 + (170 - 3T)}{2} \times 17 = 2125$ $\text{Or } \frac{1}{2} \times T_1 \times 17 + 17(170 - (T_1 + T_2)) + \frac{1}{2} \times 17 \times T_2 = 2125$ $\text{Or } 2125 = \frac{17}{2} (170 + T')$	M1	Form an equation for total distance with their times
		A2	-1 each error
	$T = 30$ $\text{Or } T_1 + T_2 = 90$	A1	Use their equation and the correct ratio to find the value for time decelerating or the total of time accelerating and decelerating
		M1	Use of $v = u + at$ or equivalent
	$\text{decel} = \frac{17}{30} \text{ oe}$	A1	(0.56) 3sf or better. Must be positive.
		(7)	
		10	