Question number	Scheme	Marks
7 (a)	$v = 0 \Rightarrow 5\cos 2t = 0$ and solve to t = …	M1
	$t = \frac{1}{2} \times \frac{\pi}{2} = \frac{\pi}{4}$ or 0.7853.... (accept 0.785 or better)	A1 [2]
(b)	$a = -10\sin 2t$	M1A1
	$\lvert a_{\max} \rvert = 10\left(\text{ m/s}^2\right)$	A1 [3]
(c)	$s = \int 5\cos 2t \, \mathrm{d}t = \frac{5}{2}\sin 2t \ \ (+c)$ $t = 0 \ \ s = 0.2 \Rightarrow c = 0.2$	M1A1 dM1
	$t = \frac{\pi}{4} \ \ s = \frac{5}{2}\sin\frac{\pi}{2} + 0.2 = 2.7$ oe (m)	A1 [4]
	ALT $s - 0.2 = \int_0^{\frac{\pi}{4}} 5\cos 2t \, \mathrm{d}t = \left[\frac{5}{2}\sin 2t\right]_0^{\frac{\pi}{4}}$ Substitute limits M1 Correct answer A1	{dM1A1}
		Total 8 marks

Notes		
(a)	M1	Sets $5\cos 2t = 0$ and finds a value for t. Allow work in degrees for this mark.
	A1	$t = \frac{\pi}{4}$ (accept 0.785 or better)
(b)	M1	Attempts to differentiate the given v to achieve as a minimum $-k\sin 2t \quad k \neq 0$
	A1	For $a = -10\sin 2t$
	A1	For 10 (m/s^2) do not accept -10 for this mark
(c)	M1	For an attempt to integrate the given v to achieve as a minimum $\frac{k\sin 2t}{2}, k \neq 2$
	A1	For the correct integrated expression for s, $+c$ not required for this mark.
	dM1	For an attempt to find c when $t = 0$ and uses $t = \frac{\pi}{4}$ (allow 45°) to find a value for s. Some are adding 0.2 at the end of their calculation which is fine for this mark.
	A1	$s = 2.7$
ALT		
(c)	M1	For an attempt to integrate the given v to achieve as a minimum $\frac{k\sin 2t}{2}, \quad k \neq 2$
	A1	For the correct integrated expression for s
	dM1	Substitutes in **both** limits of $\frac{\pi}{4}$ and 0 (allow 45°) into a changed expression, and adds 0.2 to find a value of s
	A1	For $s = 2.7$