Question Number	Scheme	Marks	Notes
1a	Find first and second derivatives of x wrt t	M1	Must see both derivatives with $\cos \to \sin \to \cos$ Condone sign errors
	$\dot{x} = -0.6k \sin\left(kt + \frac{\pi}{4}\right)$, $\ddot{x} = -0.6k^2 \cos\left(kt + \frac{\pi}{4}\right)$	A1	Both derivatives correct.
	$\ddot{x} = -k^2 x$ *	A1*	Obtain **given answer** from full and correct working
		(3)	
1b	Amplitude = 0.6 (m)	B1	Correct only
		(1)	
1c	Max speed $0.6k \left(\text{m s}^{-1}\right)$	B1	Correct only
		(1)	
1d	$4 = \frac{2\pi}{\omega} \left(= \frac{2\pi}{k}\right)$	M1	Use of $T = \frac{2\pi}{\omega}$
	$k = \frac{\pi}{2}$	A1	cao
		(2)	
1e	$\pm\frac{1}{3} = \cos\left(\frac{1}{2}\pi t + \frac{\pi}{4}\right)$	M1	Solve for a relevant value of t Allow with their k.
	$t_1 = 0.2837..$	A1	One correct time
	$t_2 = 0.7163..$, $T = t_2 - t_1$	M1	Complete method to obtain the required time
	Time A to B = 0.43 (s)	A1	0.43 or better
		(4)	
		[11]	