Question Number	Scheme	Marks
7(a)	$F = \mu mg$	B1
	For P: $mg - kmg = ma$ Allow $mg - T = ma$	M1A1
	For Q: $kmg - F = ma$ Allow $T - F = ma$	M1A1
	Either of these may be replaced by : $mg - F = 2ma$ (whole system)	
	Produce an equation in k and μ only using $T = kmg$	M1
	$k = \frac{1}{2}(1+\mu)$	A1
		(7)
7(b)	Attempt to find the acceleration. [Note that some possible correct forms are: $a = \frac{1}{2}g(1-\mu)$ or $g(1-k)$ or $g(k-\mu)$]	M1
	$d = \frac{1}{2} \times \frac{1}{2}g(1-\mu)t^2$	M1A1
	$t = \sqrt{\frac{4d}{g(1-\mu)}}$	A1
		(4)
7(c)	P or Q (or the system) would not move	B1
	Accept any of $T = mg$, $T > mg$, $T \geq mg$, $a = 0$, $a < 0$, $a \leq 0$ $F = T$, $F > T$, $F \geq T$, $F > mg$. Allow F replaced by μR **N.B**. Forces referred to must be clearly defined so e.g. use of vague terms like 'forward force' , 'opposite force', 'force to the left or right' is B0.	**D**B1
		(2)
		(13)

	Notes for question 7	
7(a)	B1 for $F = \mu mg$ seen e.g. on a diagram	
	M1 Equation of motion for P with correct no. of terms, condone sign errors	
	A1 Correct equation (allow $-a$)	
	M1 Equation of motion for Q with correct no. of terms, condone sign errors	
	A1 Correct equation (allow $-a$) **N.B**. ($-a$) must be used in both equations	
	M1 for producing **an equation** in k and μ only	
	A1 oe Must appear in (a)	
7(b)	M1 Attempt to find the acceleration in terms of g and μ or g and k or g, k and μ	
	M1 Complete method to find an equation in d, g, t and μ only, condone a sign error.	
	A1 Correct equation in d, g, t and μ only	
	A1 Any equivalent form	
7(c)	B1 Correct statement. B0 if incorrect extras.	
	DB1 Correct reason	