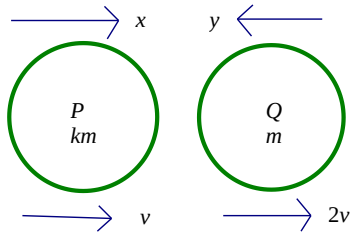
6a			
	They need to form three equations, one of which must be the impact law. Mark them as you see them, so the first M1A1 on epen is available for the first equation seen, the second M1A1is for the second equation seen etc. If there are more than 3 equations, mark this as multiple attempts and all the marks for the equations actually used in the solution. **Treat the second and third A marks as follow through marks if they are substituting values they have already found.**		
	Use of $I = mv - mu$ for P or Q	M1	Dimensionally correct. Need all terms. M0 if m is missing on RHS
	$5mv = m\left(2v - \left(-y\right)\right)$ or $-5mv = km\left(v - x\right)$	A1	Correct unsimplified equation
	Use of CLM or second use of $I = mv - mu$	M1	Dimensionally correct. Need all terms. In CLM allow cancelled m and extra common factor (eg g) throughout
	$kmx - my = kmv + 2mv$ $(kx - y = kv + 2v)$ or $-5mv = km\left(v - x\right)$	A1	Correct unsimplified equation
	Use of impact law	M1	Must be used with e on the correct side. Condone sign errors
	$2v - v = \frac{1}{5}\left(x + y\right)$	A1	Correct unsimplified equation
	$y = 3v$	A1	cao
	$x = 2v$	A1	cao
	$k = 5$	A1	cao
		[9]	
6b	KE lost	M1	Dimensionally correct. Accept change in KE. Not scored until they form the complete substituted equation.
	$= \frac{1}{2} \times km\left(x^2 - v^2\right) + \frac{1}{2} \times m\left(y^2 - 4v^2\right)$ $\left(= \frac{15}{2}mv^2 + \frac{5}{2}mv^2\right)$	A1ft	Correct unsimplified expression. Follow their x, y, k Condone sign change without explanation. $\left(\text{KE before} = 14.5mv^2\right.$ $\left.\text{KE after} = 4.5mv^2\right)$
	$= 10mv^2$	A1	Only
		[3]	
		(12)	