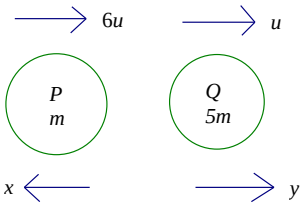
Q	Scheme	Mark	Notes
7a			If $6u$ and u are in opposite directions, mark as a sign error.
	Use of CLM	M1	Need all 4 terms. Dimensionally consistent. Condone sign errors Condone x in the wrong direction
	$6mu+5mu=5my-mx$ $(11u=5y-x)$	A1	Correct unsimplified equation
	Use of impact law	M1	Used correctly. Dimensionally correct. Condone sign errors
	$x+y=5eu$	A1	Correct unsimplified equation. Signs consistent with their CLM equation
	Solve for x in terms of e and u: $6x=25eu-11u$ or solve for e in terms of y and u: $e=\frac{6y-11u}{5u}$	DM1	Dependent on the first 2 M marks. As far as $kx=..$ Dependent on the previous 2 M marks
	Use $x>0$ $(\Rightarrow y>\frac{11}{5}u)$: $25e>11$	DM1	Use correct inequality for their x
	$\frac{11}{25}<e(\leqslant 1)$	A1	Or equivalent. Condone if 1 not mentioned. Allow with <1. A0 if incorrect upper limit. cso
		[7]	
7b	$x=\frac{2}{3}u$ and $y=\frac{7}{3}u$	B1	Seen or implied
	Total KE lost $=\left(\frac{1}{2}m\times 36u^2+\frac{1}{2}5m\times u^2\right)$ $-\left(\frac{1}{2}m\times x^2+\frac{1}{2}5m\times y^2\right)$	M1	Complete expression. Dimensionally correct. Correct masses connected to correct speeds. Condone subtraction in the wrong order. Allow in x and y
	$=\left(\frac{1}{2}m\times 36u^2+\frac{1}{2}5m\times u^2\right)$ $-\left(\frac{1}{2}m\times\frac{4}{9}u^2+\frac{1}{2}5m\times\frac{49}{9}u^2\right)$	A1ft	Correct unsimplified expression in m and u. Follow their x, y with e substituted
	$=\frac{20}{3}mu^2$	A1	Or single term equivalent. Accept $6.7mu^2$ or better
		[4]	
7c	velocity of Q after collision with wall $=\pm fy$ $\left(=\pm f\times\frac{7}{3}u\right)$	B1ft	Follow their y (in terms of u)
	Second collision if $fy>x$ $\frac{7}{3}fu>\frac{2}{3}u$	DM1	Correct inequality for their x, y Dependent on the B1 and P moving away from the wall
	$\frac{2}{7}<f\leqslant 1$	A1	Correct only Need both limits
		[3]	
		(14)	