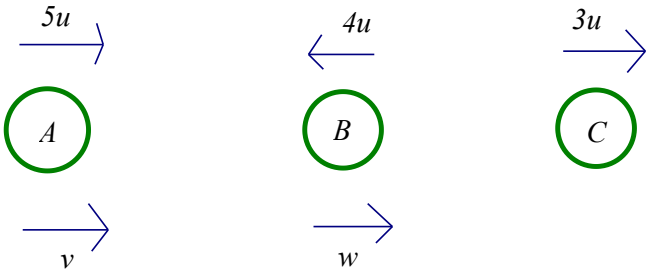
Question Number	Scheme	Marks
8(a)		
	CLM:	M1
	$5mu-4mu=mv+mw \qquad (u=v+w)$	A1
	NEL:	M1
	$w-v=9ue$	A1
	Solve for v or w	DM1
	$w=\frac{u}{2}(9e+1)$	A1
	$v=\left\|\frac{u}{2}(1-9e)\right\|$	A1
		(7)
8(b)	Use of $v<0$ to find inequality involving e	M1
	$\frac{1}{9}<e$	A1
	Use of $w \leqslant 3u$	M1
	$\frac{1}{9}<e\leq\frac{5}{9}$	A1
		(4)

Notes	
(a) M1	Conservation of linear momentum. Needs all terms and dimensionally consistent but condone sign errors.
A1	Correct equation (m may be cancelled)
M1	Impact law. Condone sign errors but must not be reciprocal.
A1	Correct equation with directions consistent with momentum equation. **N.B.** Mark the equations even if inconsistent with any directions on their diagram
ddM1	Solve for v or w dependent on both previous M marks.
A1	Correct expression for speed of B after collision.
A1	Correct expression for speed of A; must include modulus as demand specifies speed.
(b) M1	Inequality considering direction of A reversed (i.e. their $v<0$)
A1	Correct lower inequality. Must be strict inequality.
M1	Second inequality requiring speed of B to be less than or equal to the speed of C but condone strict inequality ($w<3u$)
A1	cao