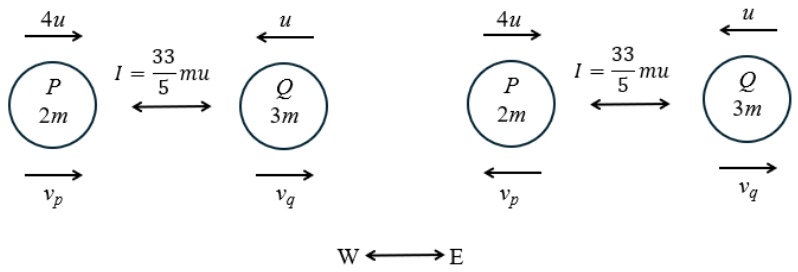
Question Number	Scheme	Marks
1		
(a)	Impulse-momentum equation for P	M1
	$-\frac{33}{5}mu = 2m(v_P - 4u)$ or $-\frac{33}{5}mu = 2m(-v_P - 4u)$	A1
	(speed of P =) $0.7u$ due East	A1
		(3)
(b)	Impulse-momentum equation for Q	M1
	$\frac{33}{5}mu = 3m(v_Q - -u)$	A1
	(speed of Q =) $1.2u$ due East	A1
		(3)
		[6]

Notes	
Note: Parts (a) and (b) may be marked together. Allow part (b) to be answered before part (a).	
1(a)	
M1	Form an equation to find v_P. Either Form a dimensionally correct impulse-momentum equation for P (using $2m$ and $4u$). Must attempt difference in momenta. M0 if g's are included on RHS. Condone sign errors. Or Form a dimensionally correct CLM equation in v_P (m and u) only. Allow consistent extra g's and cancelled m's and sign errors but masses and velocities must be correctly paired. Condone sign errors.
A1	A correct unsimplified equation in v_P (m and u) only CLM: $2m(4u) + 3m(-u) = 2m(v_p) + 3m(1.2u)$
A1	Correct answer, both speed and direction. Direction must be stated, not just seen on a diagram. For direction, accept E (or 'unchanged', 'same' or 'continues in its original direction' or 'towards Q'). A0 if only 'to the right' or 'positive direction'

1(b)	
M1	Form an equation to find v_Q. Either Form a dimensionally correct impulse-momentum equation for Q (using $3m$ and u). Must attempt difference in momenta. M0 if g's are included on RHS. Condone sign errors. Or Form a dimensionally correct CLM equation in v_Q (m and u) only. Allow consistent extra g's and cancelled m's and sign errors but masses and velocities must be correctly paired.
A1	Correct unsimplified equation in v_Q (m and u) only CLM: $2m(4u)+3m(-u)=2m(0.7u)+3m(v_q)$
A1	Correct answer, both speed and direction. Direction must be stated, not just seen on a diagram. For direction, accept E (or 'reverses direction' or 'opposite direction' or 'in the original direction of P', 'away from P') A0 if only 'to the right' or 'positive direction' or 'changed direction'