Q	Scheme	Marks	Notes
1(a)	Expression for total KE before collision	M1	Dimensionally correct. Condone confusion between before and after for A . Allow if vectors seen in the working but the modulus is used correctly. The two parts must be added together Allow confusion of 2 kg and 3 kg
	$\frac{1}{2}\times 2\times 5^2+\frac{1}{2}\times 3\times(3^2+(-1)^2)$	A1	correct unsimplified expression
	= 40 (J)	A1	cao
		(3)	
1(b)	$2((3\mathbf{i}+2\mathbf{j})-5\mathbf{j})$	M1	change in momentum of A, must be a difference but allow subtraction in either order Must be using the correct mass, 2 kg
	$=(6\mathbf{i}-6\mathbf{j})$ (N s)	A1	Cao The final answer should be in terms of **i** and **j** because this is asked for in the question. Accept 2(3**i** – 3**j**) ISW
		(2)	
1(c)	impulse-momentum equation for B	M1	must use negative of their answer to (b) and the initial velocity of B Must be using the correct mass, 3 kg or CLM with correct terms (allow slip) and plus signs
	$3(\mathbf{v}_B-(3\mathbf{i}-\mathbf{j}))=(-6\mathbf{i}+6\mathbf{j})$ or $2\times 5\mathbf{j}+3(3\mathbf{i}-\mathbf{j})=2(3\mathbf{i}+2\mathbf{j})+3\mathbf{v}_B$	A1ft	correct unsimplified equation ft on their impulse from (b)
	$\mathbf{v}_B=(\mathbf{i}+\mathbf{j})$ (m s^{-1})	A1	Cao Accept column vector ISW
		(3)	
		(8)	