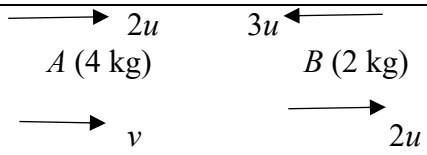
Question Number	Scheme	Marks
1(a)	 CLM: $(4\times 2u)+(-3u\times 2)=4v+(2\times 2u)$ **OR** Equating impulses: $2(2u--3u)=4(-v--2u)$	M1 A1
	$\frac{1}{2}u\left(\text{m s}^{-1}\right)$	A1
		(3)
1(b)	The direction of motion is reversed.	B1
		(1)
1(c)	For B: $I=\pm 2(2u--3u)$ **OR** For A: $I=\pm 4\left(\frac{u}{2}--2u\right)$	M1 A1
	$I=10u$ Ns or $10u$ kgms^{-1}	A1
		(3)
		(7)

Notes		
(a)		
M1	Dimensionally correct CLM equation or equating of impulses equation. Allow consistent extra g's. Ignore sign errors. May be $+v$ or $-v$	
A1	Correct unsimplified equation	
A1	Cao. Must be **positive.**	
(b)		
B1	Accept *opposite direction.* Do not accept *changed* or *to the left or backwards*, away from B **N.B.** This mark is **dependent** on **correctly** obtaining $\frac{1}{2}u$ or $-\frac{1}{2}u$ in (a)	
(c)		
M1	Dimensionally correct impulse-momentum equation using A or B. Condone sign errors with appropriate velocities. M0 if g is included	
A1	Correct unsimplified equation	
A1	Cao **with** units. Accept kg m/s	