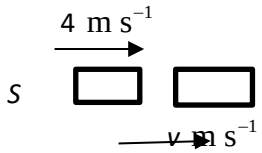
Question Number	Scheme	Marks
1.		
1(a)	$20000\times 4 = 50000v$ $v = 1.6(\text{m s}^{-1})$ **OR** $20(-v-(-4)) = 30(v-0)$	M1 A1
		(2)
1(b)	$\pm 20000(1.6-4)$ **OR** $\pm 30000\times 1.6$	M1A1**ft**
	48000 N s or 48 kN s	A1
	.	(3)
		(5)
	Notes for question 1	
1(a)	M1 for a CLM equation, condone sign errors and extra *g*'s and any equivalent equation (e.g. 2 x 4 = 5*v*, 20 x 4 = 50*v*, 200 x 4 = 500*v*,… etc) OR : for equating impulses	
	A1 oe Units **not** needed **but must be positive**.	
1(b)	M1 impulse-momentum equation, dimensionally correct, correct no. of terms, condone sign errors but must be attempting a difference of momenta (allow 20 or 30 for the mass, M0 if *g* included or mass omitted)	
	A1**ft** a correct equation, follow through on their *v* (allow 20 or 30 for the mass) **N.B**. If using *S* to find the impulse, 4 and their *v* must have opposite signs when awarding the A1ft.	
	A1 cao **units needed** (allow kg m s^{-1}) and must be positive.	