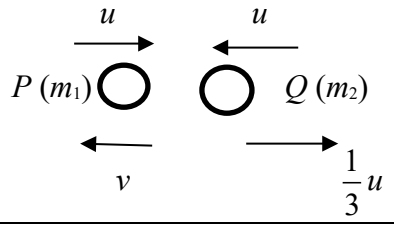
Jan 2020 WME01
Final

Question Number	Scheme	Marks
1(a)		
	$\pm m_2\left(\frac{1}{3}u--u\right)$	M1 A1
	$\frac{4m_2u}{3}$	A1 (3)
(b)	CLM: $m_1u-m_2u=-m_1v+m_2\frac{1}{3}u$ **OR** $\frac{4m_2u}{3}=m_1\left(v--u\right)$	M1 A1
	$\frac{u(4m_2-3m_1)}{3m_1}$ oe	A1
		(3)
(c)	$\frac{u(4m_2-3m_1)}{3m_1}>0$	M1
	$(4m_2-3m_1)>0 \Rightarrow 4m_2>3m_1 \Rightarrow m_2>\frac{3}{4}m_1$ * **Given answer**	A1*
	N.B. If they use $-v$ in (b), can score M1 for $-v<0$ and possibly A1.	(2) **(8)**
	Notes for question 1	
1(a)	M1 for impulse-momentum principle applied to Q ; condone sign errors but must be using m_2 for mass and subtracting momenta M0 if it's dimensionally incorrect e.g if g is included.	
	First A1 for $\pm m_2\left(\frac{1}{3}u--u\right)$	
	A1 Correct answer, must be positive and a single term (Allow fraction replaced by a decimal to at least 2 SF)	
(b)	M1 CLM , with usual rules (allow consistent extra g's), or impulse-momentum principle applied to P, using their answer from (a) which must be in terms of m_2 and u (but allow consistent extra g's)	
	A1 Correct equation (allow consistent use of $-v$ instead of v)	
	A1 Correct answer only. Any equivalent expression with m_2 terms collected (Allow fraction replaced by a decimal to at least 2 SF)	
(c)	M1 Correct inequality for their v, containing u . **N.B**. Their first statement must include u **and** >0 or <0 as appropriate	
	A1* Correct given answer correctly obtained. **N.B.** $\frac{3}{4}m_1<m_2$ is A0	