

Question Number	Scheme	Marks
3(a)	$M(D), mg \times 1.2 = 30g \times 0.8$	M1 A1
	Other possible equations: $(\uparrow) R = mg + 30g$ $M(A) \quad 2.5mg + 30g \times 4.5 = 3.7R$ $M(G) \quad 30g \times 2 = 1.2R$ $M(C) \quad mg \times 2 = 0.8R$ $M(B) \quad 2.5mg + 30g \times 0.5 = 1.3R$	
	$m = 20 \text{ (kg)}$	A1
	N.B. Allow an inequality if they state $m = 20 \text{ (kg)}$ at the end	(3)
3(b)	$M(D), Xg \times 3.7 + 20g \times 1.2 = 30g \times 1.3$ N.B. Allow inequality $\geq \dots$ the correct way round for M1A1ft	M1A1ft
	Other possible equations: $(\uparrow) S = mg + 30g + Xg$ $M(A) \quad 2.5mg + 30g \times 5 = 3.7S$ $M(G) \quad 30g \times 2.5 = 1.2S + Xg \times 2.5$ $M(B) \quad 2.5mg + Xg \times 5 = 1.3S$ <div style="margin-left: 100px;">where m is their answer from (a).</div>	
	$X = \frac{150}{37}, 4.1 \text{ or better } (4.05405\dots)$	A1
		(3)
3(c)	The mass of the block is concentrated at a point. oe	B1
	N.B. Must mention either mass or weight and ‘acting at a point’ or ‘concentrated at a point’.	(1)
		(7)
	Notes for question 3	
3(a)	M1 Complete method to give an equation in m only. Allow M1 if they use weight instead of mg N.B. If they don’t use $M(D)$, e.g. (\uparrow) and $M(A)$, they will need to eliminate the reaction at D to obtain the M mark. Each equation used must have the correct no. of terms and be dimensionally correct. M0 if they don’t have the reaction acting at D .	
	A1 Correct equation	
	A1 cao	
3(b)	M1 Complete method to give an equation in X only. Allow M1 if they use weight instead of Xg N.B. If they don’t use $M(D)$, e.g. (\uparrow) and $M(A)$, they will need to eliminate the reaction at D to obtain the M mark. Each equation used must have the correct no. of terms and be dimensionally correct. M0 if they don’t have the reaction acting at D .	
	A1ft Correct equation. Follow through on their 20	
	A1 cao	
3(c)	B1 Any equivalent statement.	