Question Number	Scheme	Marks	Notes
3(a)	moments equation	M1	All terms required. Dimensionally correct Condone sign errors
	$M(C),\ Mg\times1.5+100g\times3.5=637\times7$ M(A): $2Mg+400g=\frac{1}{2}T+7.5\times637$ M(P): $1.5T+100g\times2=637\times5.5$	A1	Correct unsimplified equation
	Resolve vertically or a second moments equation	M1	All terms required. Dimensionally correct Condone sign errors
	$(\uparrow),\quad T+637=Mg+100g$	A1ft	Correct unsimplified equation in M or their M, T or their T
	(i) $M=70$	A1	$69.99...=70$ is A0 (from 9.81)
	(ii) $T=1000$N or 1030 N	A1	Not 1029, not $105g$
			They need to form two independent equations. M1A1 for first equation seen M1A1ft for the second equation (ft on any result from the first eqn) A1 for M, A1 for T.
		(6)	
(b)	Assumed that the beam remains straight	B1	Not flexible B1,Does not bend B1, Extra irrelevant (e.g. centre of mass at midpoint) B0
		(1)	
(c)	$T+T=60g+100g+48g$	M1	Resolve vertically. Need all terms. Equal Ts. Condone sign errors
	($T=104g$ or 1019.2N)	A1	Correct unsimplified equation
	Moments equation	M1	All terms required. Dimensionally correct. Not using T from (a) Condone sign errors
	$M(C),\ 60g\times1.5+100g\times3.5+48g\times(x-0.5)=T\times7$ M(A): $60g\times2+100g\times4+48gx=0.5T+7.5T$ M(B): $0.5T+7.5T=48g(8-x)+4\times100g+6\times60g$ M(D): $100g\times3.5+48g(7.5-x)+60g\times5.5-7T=0$	A1	Correct unsimplified equation
	Solve for x	DM1	Solve for our x. Dependent on both preceding M marks
	$x=6.5$ (m)	A1	
	Watch out for "correct" answer from working that ignores the $100g$	(6) **(13)**	As above, M1A1 for two independent equations, then DM1A1 for solving