Question	Scheme	Mark	Notes
2a	<table><tr><td></td><td>*PQUY*</td><td>*RSTU*</td><td>*VWXY*</td></tr><tr><td>Mass</td><td>$16a^2$</td><td>$2\times4a^2$</td><td>$2\times4a^2$</td></tr><tr><td>From *PX*</td><td>$2a$</td><td>$5a$</td><td>a</td></tr></table>	B1 B1	Correct mass ratios (accept 2:1:1) Correct vertical distances
	Moments about *PX* or a parallel axis	M1	Dimensionally correct equation. All terms required Allow for an equation within a vector equation.
	$16a^2\times2a+8a^2\times5a+8a^2\times a=32a^2d$ $\left(=(16+8+8)a^2\times d\right)$ or equivalent for a parallel axis	A1	Correct unsimplified equation Allow for an equation within a vector equation. Could have *y* for *d* here o.e.
	$80a=32d\Rightarrow d=\frac{5}{2}a$ *	A1*	Obtain given answer from correct working. At least one stage of simplifying the moments equation is required. e.g. $32a^3+40a^3+8a^3$ seen, or they might have simplified the mass ratios at the start. Must get to $d=\ldots$ in the final line
		[5]	
2b	Moments about *PQ* or a parallel axis	M1	Dimensionally correct equation. All terms required
	$16a^2\times2a+8a^2\times3a+8a^2\times5a$ $=(16+8+8)a^2\times h$ or equivalent for a parallel axis	A1ft A1	Unsimplified equation with at most one error. Follow their mass ratios. Correct unsimplified equation
	$\Rightarrow h=3a$ from *PQ*	A1	a from *YT*, $3a$ from *XW*
	The working for the first 4 marks must be seen or used in part (b)		
	Correct use of trig. to find the tangent of a relevant angle.	M1	With *their* $3a$ e.g. $\tan\theta=\frac{3}{4-\frac{5}{2}}$
	$\tan\theta=2$	A1	Correct only
		[6]	
2c	Complete method to obtain an equation in *M* and *F*	M1	e.g. *M*oments about *Q* Dimensionally correct equation.
	$3a\times Mg=4a\times F$	A1	Correct unsimplified equation Condone if *a* missing throughout
	$F=\frac{3}{4}Mg$	A1	Correct only
		[3]	
		(14)	