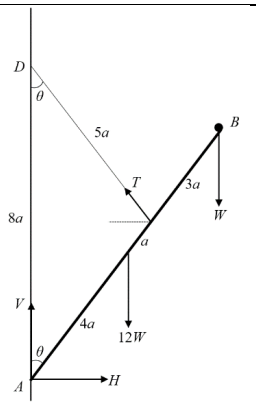
7a			NB: This is a "show that" question. The working must give a clear indication of where the lengths in the moments equation come from. Check the diagram. Could be resolving or using similar triangles. Might have resorted to using a calculator to evaluate the angles. Each term should include a trig ratio
	Moments about A	M1	Or an alternative complete method to form an equation in T. Condone sign errors and sine / cosine confusion. Need all terms and dimensionally consistent. (accept with no a)
	$12W \times 4a\sin\theta + W \times 8a\sin\theta = 5a \times T\sin 2\theta$ or $48aW\sin\theta + 8aW\sin\theta = 8aT\sin\theta$ or $48aW\sin\theta + 8aW\sin\theta = 3aT\cos\theta + 4aT\sin\theta$ $\left(48\times\frac{3}{5}W + 8\times\frac{3}{5}W = T\times 10\times\frac{3}{5}\times\frac{4}{5}\right)$	A1 A1	Unsimplified equation with at most one error Correct unsimplified equation Allow A1A0 if angle DCB used and not in terms of θ If no trig in the moments equation then M0 – given answer, so no BOD
	$56W = 8T \Rightarrow T = 7W$ *	A1*	Obtain given answer from correct working
		[4]	
7b	First equation e.g. resolve horizontally	M1	Condone sign errors and sine / cosine confusion
	$(\pm)H = T\sin\theta\left(=\frac{21}{5}W\right)$	A1	Correct unsimplified equation Alt: resolving parallel to the rod: $13W\cos\theta = T\cos 2\theta + R\cos\alpha$
	Second equation e.g. resolve vertically	M1	Condone sign errors and sine / cosine confusion
	$(\pm)V + T\cos\theta = 13W\left(V = \frac{37}{5}W\right)$	A1	Correct unsimplified equation Alt resolving perpendicular to the rod: $13W\sin\theta = R\sin\alpha + T\sin 2\theta$
	Another alternative is to use a second moments equation e.g $\text{M}(C): 5a\times R\sin\alpha + W\times 3a\sin\theta = 12W\times a\sin\theta$ $\text{M}(B): R\sin\alpha\times 8a + T\sin 2\theta\times 3a = 12W\times 4a\sin\theta$		
	$\alpha° = \tan^{-1}\frac{3}{4} - \tan^{-1}\frac{H}{V}$ or $\tan^{-1}\frac{V}{H} - \tan^{-1}\frac{4}{3}$	DM1	Complete method to obtain α Dependent on the two preceding M marks Alt gives $R\sin\alpha = \frac{27}{25}W$, $R\cos\alpha = \frac{211}{25}$
	$\alpha = 7.3$	A1	7.29205… or better. Mark 0.127 radians as a misread
		[6]	