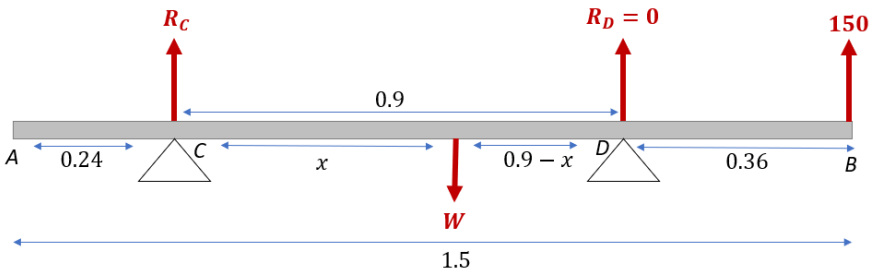
Question Number	Scheme	Marks
4.	$R_D = 0$ for scenario 1 or $R_C = 0$ for scenario 2	B1
	Scenario 1 $\text{M}(C) \quad (150 \times 1.26) = Wx$	M1 A1
	Scenario 2 $\text{M}(D) \quad (225 \times 0.36) = W \times (0.9 - x)$	M1 A1
	Solve simultaneously for W (or x) e.g. $0.81W = 243$	dM1
	$W = 300$	A1
	$x = 0.63$	A1
		(8)

NOTES

B1	**N.B**. B0 means there are no other marks available. $R_D = 0$ for scenario 1 seen on a diagram or implied by working. OR: $R_C = 0$ for scenario 2 seen on a diagram or implied by working.
M1	Complete method to form an equation in W and a consistent unknown distance *only*, for scenario 1. All equations used must be dimensionally correct and have the correct no. of terms but condone sign errors. (M0 if $R_D = 0$ is never used)
A1	Correct unsimplified equation in W and x or their defined unknown distance.
M1	Complete method to form an equation in W and a consistent unknown distance *only*, for scenario 2. All equations used must be dimensionally correct and have the correct no. of terms but condone sign errors. (M0 if $R_C = 0$ is never used)
A1	Correct unsimplified equation in W and x or their defined unknown distance
dM1	Dependent on both M's, solve simultaneous equations for either W or their unknown Correct answer for W
A1	Correct answer for x This must be the distance stated in the question, from C to the centre of mass.
A1	**N.B**. If they include g in a moments equation, they lose the A mark for that equation and both final A marks.

Scenario 1



Equations with unknown distance, x, measured from C.

Complete method will involve one moments equation with $R_D = 0$ or two equations with R_C eliminated and $R_D = 0$.

M0 if R_D never equals zero

Vert $\quad R_C + 150 = W$

M(A) $\quad \left(R_C \times 0.24\right) + \left(150 \times 1.5\right) = W\left(x + 0.24\right)$

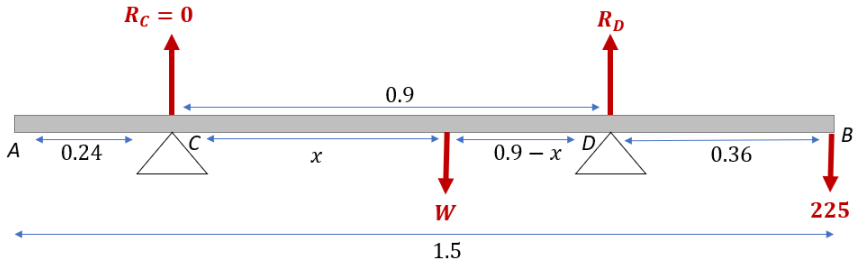
M(C) $\quad \left(150 \times 1.26\right) = Wx$

M(G) $\quad R_C\, x = 150\left(1.26 - x\right)$

M(D) $\quad \left(R_C \times 0.9\right) = \left(150 \times 0.36\right) + W\left(0.9 - x\right)$

M(B) $\quad \left(R_C \times 1.26\right) = W\left(1.26 - x\right)$

Scenario 2



Equations with unknown distance, x, measured from C

Complete method will involve one moments equation with $R_C = 0$ or two equations with R_D eliminated and $R_C = 0$.

M0 if R_C never equals zero

Vert $\quad R_D = 225 + W$

M(A) $\quad \left(R_D \times 1.14\right) = \left(225 \times 1.5\right) + W\left(x + 0.24\right)$

M(C) $\quad \left(225 \times 1.26\right) + Wx = \left(R_D \times 0.9\right)$

M(G) $\quad R_D\left(0.9 - x\right) = 225\left(1.26 - x\right)$

M(D) $\quad \left(225 \times 0.36\right) = W\left(0.9 - x\right)$