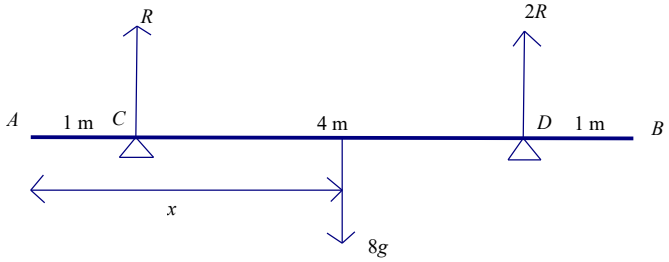
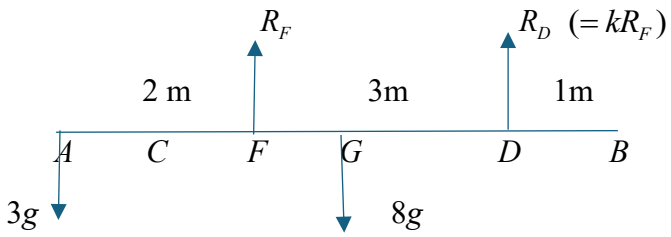
Question Number	Scheme	Marks
	N.B. Consistent omission of g in both parts of this question can score all of the marks (as can consistent use of $g = 9.81$ as it cancels) but for inconsistent omission, mark as per the scheme.	
7(a)		
	Possible equations: Resolve vertically: $3R = 8g$ M(C): $8g(x-1) = 4\times 2R$ M(D): $8g(5-x) = 4R$ M(A): $8gx = 5\times 2R + 1\times R$ M(B): $8g(6-x) = 1\times 2R + 5\times R$	M1A1 M1A1
	N.B. Their equations may not be in x, if they've clearly defined a different distance, and can score the A1 in each case.	
	$x = \frac{11}{3}$ *	**d**M1A1*
	Special Case: M(G): $R(x-1) = 2R(5-x)$	M2A2
	$(x-1) = 2(5-x)$ $x = \frac{11}{3}$ *	**d**M1 A1*
	N.B. If R and $2R$ are consistently reversed, can score max M1A1 (if vert res is used)M1A0**d**M1A0* **N.B.** If a decimal approximation is used can score max 5/6	
		(6)

Question Number	Scheme	Marks
7(b)		
	Possible equations: Resolve vertically: $R_F + R_D = 11g$ M(A): $2R_F + 5R_D = 8g \times \frac{11}{3}$ M(B): $4R_F + R_D = 8g \times \frac{7}{3} + 3g \times 6$ M(D): $3R_F = 8g \times \frac{4}{3} + 3g \times 5$ M(F): $3R_D + 3g \times 2 = 8g \times \frac{5}{3}$ M(G): $\frac{5}{3}R_F = 3g \times \frac{11}{3} + \frac{4}{3}R_D$ M(C): $(R_F \times 1) + 4R_D + 3g \times 1 = 8g \times \frac{8}{3}$	M1A1 M1A1
	$k = \frac{R_D}{R_F} = \frac{22}{77} = \frac{2}{7}$	**d**M1A1
		(6)
		12
	Notes	
	N.B. For both (a) and (b), enter marks for the equations on ePEN in the order in which the equations appear.	
(a)		
M1	Resolve or take moments, correct no. of terms, condone R and $2R$ interchanged and sign errors to give first equation.	
A1	Correct equation	
M1	Resolve or take moments, correct no. of terms, condone R and $2R$ interchanged and sign errors to give second equation.	
A1	Correct equation	
dM1	Eliminate R to produce an equation in x only, dependent on both M's	
A1*	Given answer correctly obtained.	

	Special Case:	
M2	Moments about G, condone R and $2R$ interchanged.	
A2	Correct equation	
dM1	Eliminate R to produce an equation in x only, dependent on both M's	
A1*	Given answer correctly obtained.	
(b)	**N.B.** No marks if they use their answer(s) from (a).	
M1	Resolve or take moments with correct no. of terms,but condone sign errors to give first equation.	
A1	Correct equation	
M1	Resolve or take moments with correct no. of terms, but condone sign errors to give second equation.	
A1	Correct equation	
dM1	Eliminate R_D and R_F and solve to give a numerical value of k, dependent on both M's. **N.B.** Can be scored even if it leads to $k < 0$.	
A1	Accept 0.29 or better (0.285714….)	
	N.B. If R and kR are consistently reversed, can score max M1A1 (if vert res is used) M1A0**d**M1A0	