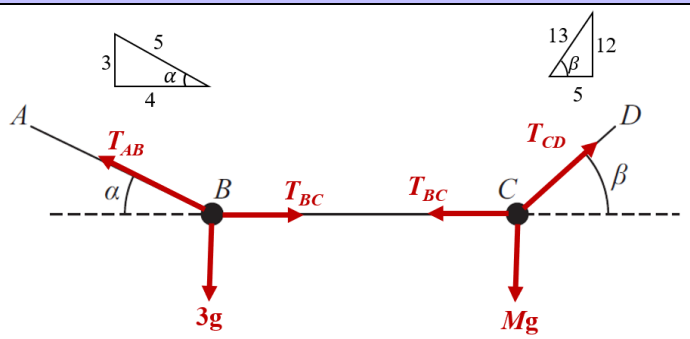
Question Number	Scheme	Marks
		
6 (a)	Use of $\sin\alpha=\frac{3}{5}$ or $\cos\alpha=\frac{4}{5}$ or $\alpha=37$ or better	B1
	Vert equilibrium at *B*	M1
	$T_{AB}\sin\alpha=3g$	A1
	$T_{AB}=49\ (\text{N})$	A1
		(4)
6(b)	Horiz equilibrium at *B*	M1
	$T_{AB}\cos\alpha=T_{BC}$	A1
	$T_{BC}=39$ or $39.2\quad(\text{N})$	A1
		(3)
6(c)	Use equilibrium to form at least one equation in T_{CD}	M1
	At least one correct out of: • H at C: $T_{CD}\cos\beta=T_{BC}\quad(102\cos\beta=T_{BC})$ • V at C: $T_{CD}\sin\beta=Mg\quad(102\sin\beta=Mg)$ • H sys: $T_{AB}\cos\alpha=T_{CD}\cos\beta\quad\left(\frac{4}{5}T_{AB}=102\left(\frac{5}{13}\right)\right)$ • V sys: $T_{AB}\sin\alpha+T_{CD}\sin\beta=3g+Mg\quad\left(\frac{3}{5}T_{AB}+102\left(\frac{12}{13}\right)=3g+Mg\right)$	A1
	Two correct equations in T_{CD}	A1
	Form an equation in *M* only Eg $\tan\beta=\frac{Mg}{T_{BC}}\Rightarrow\frac{12}{5}=\frac{Mg}{"T_{BC}"}$	dM1
	$(M=)\,9.6$	A1
		(5)
		[12]
Note		

Question Number	Scheme	Marks
Note: only penalise use of 9.81 once per whole question, only penalise over or under accuracy once per whole question.		
6 (a)		
B1	Either correct trig ratio for α seen anywhere or implied.	
M1	Method to form an equation in T_{AB} (and α) using equilibrium at B. Trig does not need to be replaced. Including m with a numerical mass term is an A error. Dimensionally correct and condone sin/cos confusion.	
A1	Correct unsimplified equation, trig does not need to be replaced.	
A1	Correct answer, accept 5g.	
6(b)		
M1	Method to form an equation in T_{BC} (and α) using equilibrium at B. Trig does not need to be replaced. Condone re-using the letter T in an equation but M0 if clearly assuming the same tension value in different sections of the string. Including m with a numerical mass term is an A error. Dimensionally correct and condone sin/cos confusion.	
A1	Correct unsimplified equation, trig does not need to be replaced.	
A1	Correct answer, accept 4g.	
6(c)		
M1	Method to form a dimensionally correct equation in T_{CD} using equilibrium at C or the whole system. Trig and tensions do not need to be replaced. If more equations are listed, mark the two that are used. Relevant equations may be seen in earlier working but must be used here to earn the mark. Condone re-using the letter T in an equation. **SC:** Note that T_{CD} =101.92. If the answer to part (b) is 102 (or better) and then 102 is used correctly in (c) then all marks are available in part (c).	
A1	At least one correct unsimplified equation. Trig and tensions do not need to be replaced.	
A1	Two correct equations. Trig and tensions do not need to be replaced.	
dM1	Dependent on previous method mark to form an equation in M only. Must use at least one valid equation but dM0 if $T_{CD} = T_{AB}$ (eg use $T_{CD} = 49$)	
A1	Correct answer, accept 9.60 and $\frac{48}{5}$ since g cancels.	