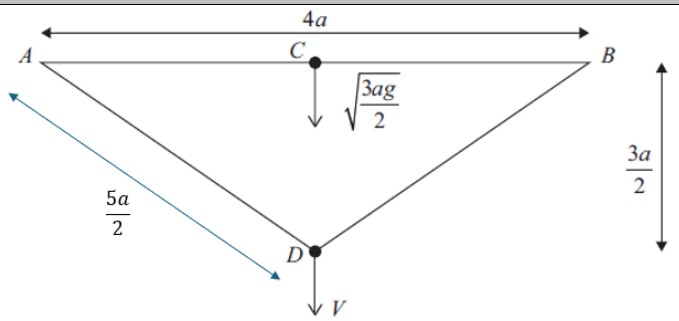
Question Number	Scheme	Marks
		
4(a)	$AD = 2.5a$ (seen or implied)	B1
	Method for the difference in 2 EPE terms (at C and D) Eg Considering the whole string $\frac{mg(5a-3a)^2}{2(3a)} - \frac{mg(4a-3a)^2}{2(3a)}$ Considering two half strings $2\times\left[\frac{mg\left(\frac{5}{2}a-\frac{3}{2}a\right)^2}{2\left(\frac{3}{2}a\right)} - \frac{mg\left(2a-\frac{3}{2}a\right)^2}{2\left(\frac{3}{2}a\right)}\right]$	M1
	$\frac{1}{2}mga$ *	A1*
		(3)
4(b)	GPE term, $mg\left(\frac{3a}{2}\right)$	B1
	Work-energy equation with all required terms	M1
	$mg\left(\frac{3a}{2}\right) = \frac{1}{2}mV^2 - \frac{1}{2}m\left(\sqrt{\frac{3ag}{2}}\right)^2 + \frac{1}{2}mga + \frac{1}{5}mg\left(\frac{3a}{2}\right)$	A1 A1
	$V = \sqrt{\frac{29ag}{10}}$	A1
		(5)
		(8)

Notes for question 4

(a)	
B1	Seen or implied eg $DB = 2.5a$ or $2.5a$ used correctly in EPE expression.
M1	Complete method using 2 EPE terms to form an expression for the change in EPE, accept subtraction either way round. The EPE terms must have the form $\frac{\lambda x^2}{2l}$ where l is the relevant natural length, i.e. $\left(\frac{3}{2}a \text{ or } 3a\right)$ and x is the extension, in terms of a, at C or D respectively.
A1*	Given answer obtained from fully correct working.
(b)	
B1	Correct GPE term , $mg\left(\frac{3a}{2}\right)$ seen or implied

M1	Complete method to form a dimensionally correct work-energy equation. All required terms present and no extra: GPE change, 2 KE and change in EPE. May use the EPE change from (a) or start again with 2 EPE terms of the correct structure (*kmg*). The work-done against resistance must have the form $\frac{1}{5}mg \times$ distance where distance is in terms of *a*. Condone ± sign errors on terms. Allow different rearrangements of the work-energy prinicple. For example, Loss = Gain + WD , Initial – Final = WD	
A1	Correct unsimplified equation with at most one error	
A1	Correct unsimplified equation	
A1	Correct answer in terms of *ag*. Accept $1.7\sqrt{ag}$ or better. If the answer is in decimal form it must be rounded correctly. Calculator display for $\sqrt{\frac{29}{10}}$ is 1.702938637	