A uniform rod AB of length $4a$ and weight W is smoothly hinged to a vertical wall at the end A. The rod is held at an angle θ above the horizontal by a light elastic string. One end of the string is attached to the point C on the rod, where $AC = 3a$. The other end of the string is attached to a point D on the wall, with D vertically above A and such that angle $ACD = 2\theta$. A particle of weight $\frac{1}{2}W$ is attached to the rod at B. It is given that $\tan\theta = \frac{8}{15}$.

(i) Show that the tension in the string is $\frac{17}{12}W$. [4]

(ii) Find the magnitude and direction of the reaction at the hinge. [5]

(iii) Given that the natural length of the string is $2a$, find its modulus of elasticity. [2]