or $2b\left[T\sin\theta + 2W(\cos^2\theta - \sin^2\theta)\right]\delta\theta = 0$

$\because$ $\delta\theta \neq 0$

$\therefore$ $2b\left[T\sin\theta + 2W(\cos^2\theta - \sin^2\theta)\right] = 0$

or $T\sin\theta + 2W(\cos^2\theta - \sin^2\theta) = 0$

or $$T = \frac{2W(\sin^2\theta - \cos^2\theta)}{\sin\theta}$$

$$= \frac{2W(1 - 2\cos^2\theta)}{\sqrt{1-\cos^2\theta}}$$

$\because$ $BD = a$ so $BO = \frac{a}{2}$

$\Rightarrow$ $\cos\theta = \frac{BO}{AB} = \frac{a/2}{b} = \frac{a}{2b}$

$\therefore$ $$T = \frac{2W\left\{1 - 2\left(\frac{a^2}{4b^2}\right)\right\}}{\sqrt{\left\{1 - a^2/4b^2\right\}}}$$

$$\boxed{T = \frac{2W\{2b^2 - a^2\}}{b\sqrt{4b^2 - a^2}}}$$

Q(2) Weights W_1, W_2 are fastened to a light inextensible string ABC at the points B, C, the end A being fixed. Prove that, if a horizontal force P is applied at C and in equilibrium AB, BC are inclined at angles θ, ϕ to the vertical, then

$$P = (W_1 + W_2)\tan\theta = W_2\tan\phi.$$