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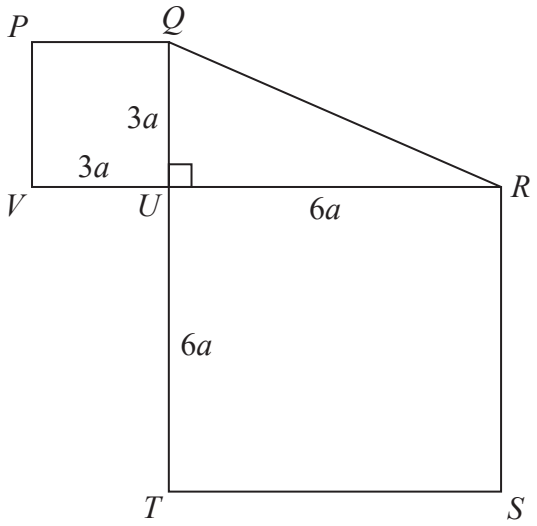


Figure 3

The template shown in Figure 3 is formed by joining together three separate laminas. All three laminas lie in the same plane.

- $PQUV$ is a uniform square lamina with sides of length $3a$
- $URST$ is a uniform square lamina with sides of length $6a$
- QRU is a uniform triangular lamina with $UQ = 3a$, $UR = 6a$ and angle $QUR = 90°$

The mass per unit area of $PQUV$ is k, where k is a constant.
The mass per unit area of $URST$ is k.
The mass per unit area of QRU is $2k$.

The distance of the centre of mass of the template from QT is d.

(a) Show that $d = \frac{29}{14}a$

(5)

The template is freely suspended from the point Q and hangs in equilibrium with QR at $\theta°$ to the downward vertical.

(b) Find the value of θ

(7)

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Q7

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