

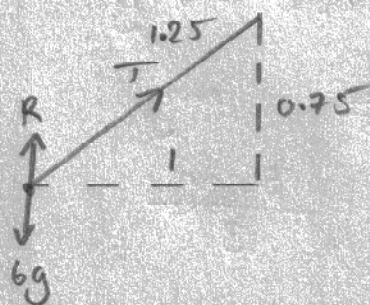
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Change 25rpm to rads^{-1}

$$\frac{25}{60} \text{ revs per sec}$$

$$\frac{25}{60} \times 2\pi = \frac{5\pi}{6} \text{ rads}^{-1}$$

When mass is on table forces are:

Resolving vertically $R + T \cos \theta = 6g$

$$R + T \cdot \frac{3}{5} = 6g \quad (1)$$

Resolving horizontally for circular motion.

$$T \sin \theta = m\omega^2$$

$$T \cdot \frac{4}{5} = 6 \cdot 1 \cdot \left(\frac{5\pi}{6} \right)^2$$

$$\frac{4T}{5} = \frac{6 \times 1 \times 25 \times \pi^2}{366}$$

$$T = \frac{125\pi^2}{24}$$

Sub T into (1)

$$R = 6g - \frac{\frac{125\pi^2}{24}}{8} \cdot \frac{3}{5}$$

$$= 6g - \frac{75\pi^2}{24}$$

$$= 58.8 - 30.85$$

$$= 27.95$$

$$= 28 \text{ N (3sf)}$$

$$\left(\begin{array}{l} g = 9.8 \\ \pi = 3.142 \end{array} \right)$$