Answer on Question #69944 – Physics – Mechanics | Relativity

A stone of mass 0.3 kg tied to one end of a string 0.8m a long and rotated in a vertical circle. At what speed of the ball will the tension in the string be zero at the highest point of the circle? What would be the tension at the lowest point in this case?

Solution. At the highest point of the circle we have:

$$ma = mg$$
,

or

$$\frac{mv^2}{l} = mg \rightarrow v = \sqrt{gl} \approx 2.8 \ \frac{m}{s}.$$

At the lowest point we have

$$ma = T - gm \rightarrow T = m\left(\frac{v^2}{l} + g\right) \approx 5.9 N$$

Answer. $v = 2.8 \frac{m}{s}$, T = 5.9 N.

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