Strings and Tension
PHYS 2425

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1. Conceptual Questions

A. A block rests on a merry-go-round that is spinning at a constant angular speed. What role does friction play in keeping the block moving in a circle?

B. A ball is attached to a string and whirled in a horizontal circle so that the string makes an angle θ with the vertical (a conical pendulum). Why is the vertical component of the tension not "wasted," even though it doesn't contribute to the circular motion?

C. If the the same ball decreases its radius, what must have happened to its speed?

D. Suppose there is a conical pendulum whose angle relative to the vertical axis is approaching 90°. What prevents the angle from actually reaching 90°?

2. Newton's Laws

A. A small ball with mass $m = 0.5kg$ is attached to a physics string, $L = 1.2m$ and moves in a steady horizontal circle. (A conical pendulum.) The string makes an angle of $\theta = 30°$ with the vertical axis. Find the ball's (i) speed, (ii) angular speed ω, (iii) period T, and (iv) tension $\vec{T}$.