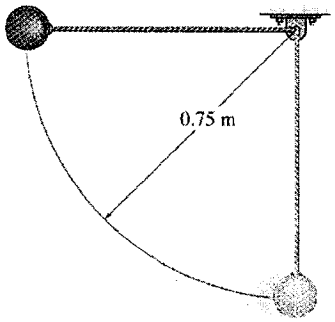
中國文化大學 101 學年度碩士班考試入學招生考試

系所組：機械工程學系數位機電碩士班乙組

日期節次：101 年 3 月 17 日第 3 節 13:00~14:30

科目：動力學

1. If the pendulum with $l = 0.75$ m is released from the horizontal position, the velocity of its bob in the vertical position is _____. (20%)



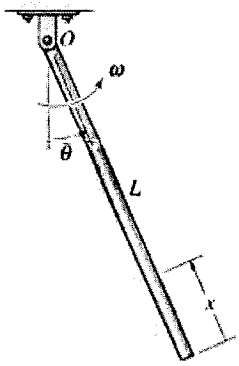

A) 3.8 m/s. B) 6.9 m/s.

C) 14.7 m/s. D) 21 m/s.

2. The wheel has a radius of 15 in and rotates clockwise at a rate of ω = 3 rad/s. What is the velocity of its center? (20%)

A) 5 in/s B) 15 in/s C) 0 in/s D) 45 in/s.

3. The bar has a weight per length of $w$. If it is rotating in the vertical plane at a constant rate ω about point $O$, determine the internal normal force, shear force, and moment as a function of $x$ and $\theta$. (30%)




4. A ball of mass $m$ and radius $r$ is cast onto the horizontal surface such that it rolls without slipping. Determine the minimum speed $v_G$ of its mass center $G$ so that it rolls completely around the loop of radius $R + r$ without leaving the track. (30%)