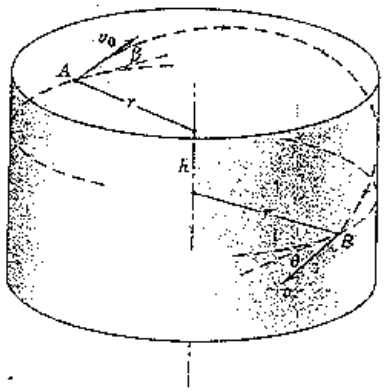
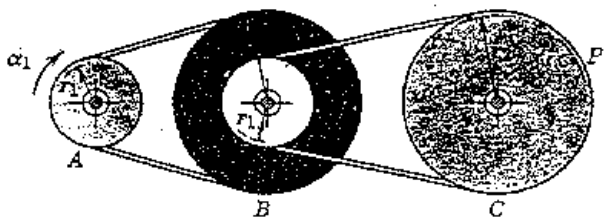
國立中央大學九十學年度碩士班研究生入學試題卷

所別：機械工程學系　甲組　科目：甲動力學　共 1 頁 第 1 頁

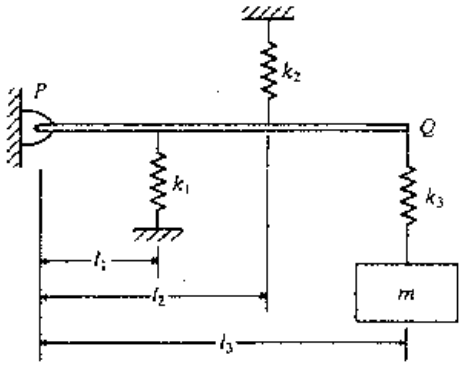
1. A particle is released on the smooth inside wall of a cylindrical tank at A with a velocity v_0 that makes an angle β with the horizontal tangent. When the particle reaches a point B a distance h below A, determine the angle θ and velocity v at point B. (25 %)



2. A V-belt speed-reduction drive is shown where pulley A drives the two integral pulleys B which in turn drive pulley C. If A starts from rest at time $t=0$ and is given a constant angular acceleration α_1, derive expressions for the angular velocity of C and the magnitude of the acceleration of a point P on the belt both at time t. (25 %)



3. Find the equation of motion and the natural frequency of the system. Here, the supported beam must be treated as an elastic beam. (25%)



4. For the pivoted slender rod of length l, determine the distance x for which the angular velocity will be a maximum as the bar passes the vertical position after being released in the horizontal position shown. State the corresponding angular velocity. (25%)