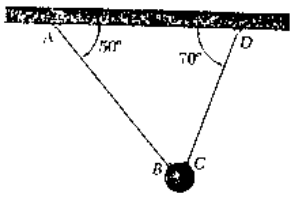
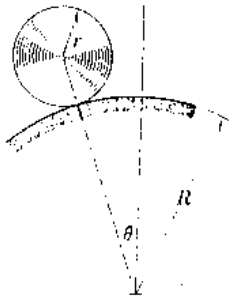
國立中央大學八十六學年度碩士班研究生入學試題卷

所別: 機械工程研究所 甲組 科目: 甲動力學 共 1 頁 第 1 頁

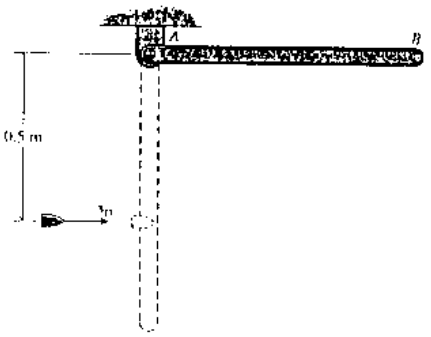
1. A sphere of weight W is held by two wires AB and CD. If AB is cut, find the tension in CD, (25%)
   (a) before AB is cut,
   (b) immediately after AB has been cut,
   (c) immediately after AB has been cut if AB and CD are changed to TWO SPRINGS.



2. The circular disk of mass M and radius r is released from rest with $\theta = 0°$ and rolls without slipping on the circular guide of radius R. Calculate the angle θ at which contact between the disk and the guide ceases. (25%)



3. A 3kg uniform slender rod AB 800mm long is released from rest when it is horizontal as shown in figure. If a 0.03kg bullet with the initial velocity of $v_0 = 350$m/s strikes the rod when it is vertical and becomes embedded in it, determine: (25%)
   (a) The angular velocity of the rod and bullet immediately after the impact.
   (b) The total system energy lost in the impact.
   (c) The maximun angle through which the rod will swing after the collision.



4. The triangular frame is constructed of uniform slender rod and is pivots about a horizontal axis through point O. Determine the critical driving frequency ω_c of the block B which will result in oscillations of the assembly which would tend to become excessively large. The total mass of the frame is m. (25%)