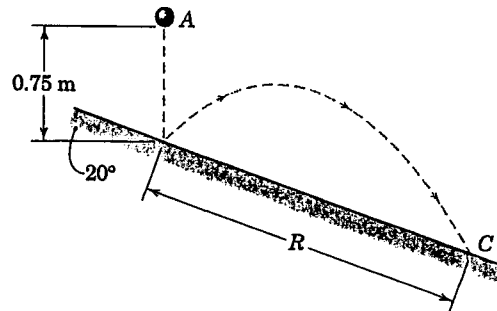


國立臺灣科技大學
九十三學年度碩士班考試試題

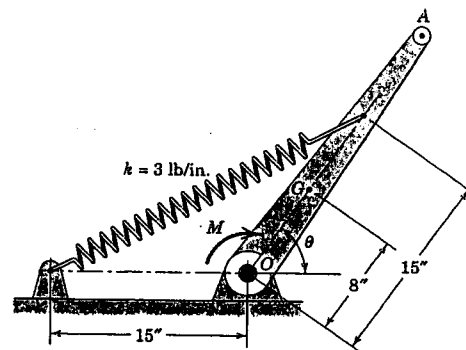
系所組別：機械工程系甲組、機械工程系丁組
科 目：動力學

(總分 100 分)

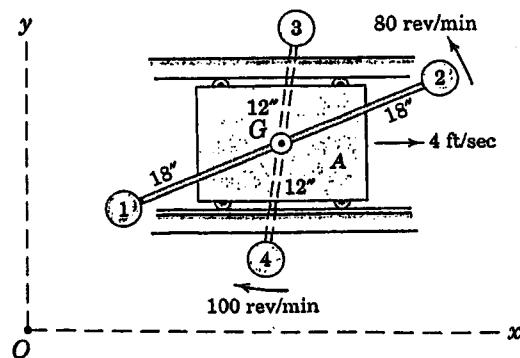
1. The ball is released from position A and drops 0.75 m to the incline. If the coefficient of restitution in the impact is $e = 0.85$, determine the slant range R . (25%)



2. The 12-lb lever OA with 10-in. radius of gyration about O is initially at rest in the vertical position ($\theta = 90^\circ$), where the attached spring of stiffness $\kappa = 3$ lb/in. is unstretched. Calculate the constant moment M applied to the lever through its shaft at O which give the lever an angular velocity $\omega = 4$ rad/sec as the level reaches the horizontal position $\theta = 0$. (25%)



3. The 32.2-lb carriage A moves horizontally in its guide with a speed of 4 ft/sec and carries two assemblies of balls and light rods which rotate about a shaft at the center of mass of the system G in the carriage. Each of the four balls weighs 3.22 lb. The assembly on the front face rotates counterclockwise at a speed of 80 rev/min, and the assembly on the back side rotates clockwise at a speed of 100 rev/min. For the entire system, calculate (a) the linear momentum, (b) the kinetic energy, (c) the angular momentum about point G, and (d) the angular momentum about point O, the x- and y- coordinates of G are 24" and 18" respectively. (25%)



4. The 24-kg uniform slender bar AB is mounted on end rollers of negligible mass and rotates about the fixed point O as it follows the circular path in the vertical plane. The bar is released from a position which gives it an angular velocity $\omega = 2$ rad/sec as it passes the position $\theta = 45^\circ$. Calculate the forces F_A and F_B exerted by the guide on the rollers for this instant. (25%)

