國立中正大學九十四學年度碩士班招生考試試題

系所別：光機電整合工程研究所　　科目：應用力學

第 2 節　　

1. In figure 1, The pin at A can support a maximum force of 6.4 kN. What is the corresponding maximum load L which can be supported by the bracket? (25%)

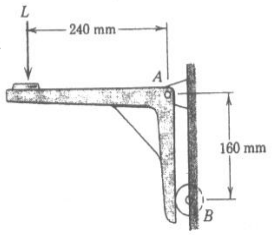

Figure 1

2. The two balls are attached to the light rigid rod, see figure 2, which is suspended by a cord from the support above it. If the balls and rod, initially at rest, are struck by the force F=120N, calculate the corresponding acceleration $\bar{a}$ of the mass center and the rate $\ddot{\theta}$ at which the angular velocity of the bar is changing, by using conservation of angular momentum. (25%)

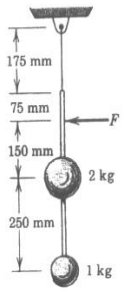

Figure 2

3. The bent rod OAB rotates about the vertical OB, see figure 3. At the instant considered, its angular velocity and angular acceleration are, respectively, 20 rad/s and 200 rad/s^2, both clockwise when viewed from the position Y axis. The collar D moves along the rod and, at the instant considered, OD = 8 in., and the velocity and acceleration of the collar relative to the rod are, respectively, 50 in./s and 600 in./s^2, both upward. Determine
   (a) The velocity of the collar,
   (b) The acceleration of the collar. (25%)

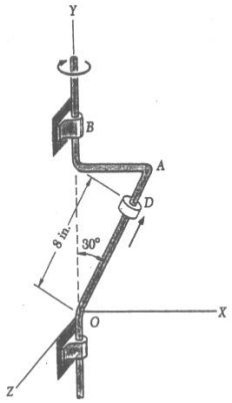

Figure 3

4. A cylinder of weight W and radius r is suspended from a looped cord as shown in figure 4. One end of the cord is attached directly to a rigid support while the other end is attached to a spring of constant k. Determine the period and frequency of vibration of the cylinder. (25%)

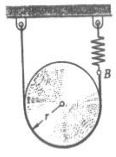

Figure 4