

國立臺北科技大學九十六學年度碩士班招生考試

系所組別：1120 機電整合研究所乙組

第二節 工程力學 試題

第一頁 共一頁

**注意事項：**

1. 本試題共 4 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. In Fig.1, if we neglect the weight of links 2, 3 and 4, determine the reading of the scale we would expect as a result of the 50-N block on link 2 of the mechanism? (20%)

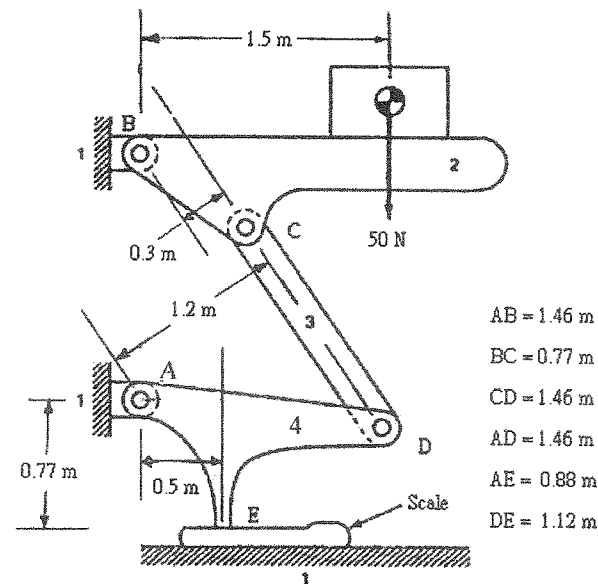


Fig. 1

2. In Fig. 2, bar AB rotates with a constant counterclockwise angular velocity of 2 rad/s. Block B slides in a circular slot in the curved bar BC. At the instant shown, the center of the circular slot is at D. At the instant shown, determine the angular velocity and angular acceleration of bar BC. (30%)

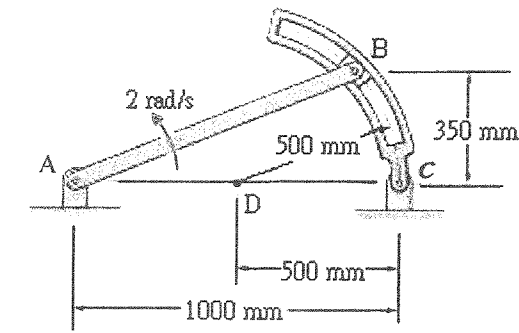


Fig. 2

3. The homogeneous semicircular disk has a mass of 100 kg and is released from rest from the position shown in Fig. 3. The coefficients of static and kinetic friction between the disk and the beam are  $\mu_s = 0.25$  and  $\mu_k = 0.15$ , respectively. Determine the initial reactions at the pin A and roller B used to support the beam. Neglect the mass of the beam for the calculation. (30%)

*Hint:* the distance from the centroid of the semicircular disk to point O is  $(4r/3\pi)$ , where  $r = 0.4$  m.

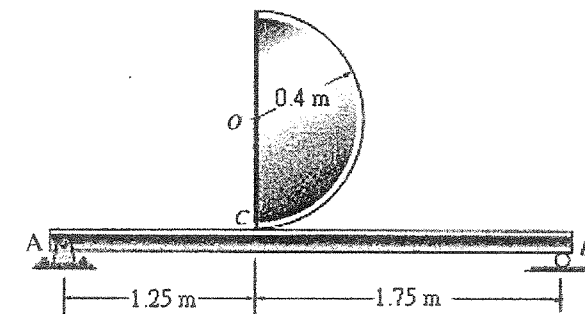


Fig. 3

4. As shown in Fig.4, the slender bar (mass  $m = 5$  kg, length  $L = 2$  m) is released from rest at a height  $h = 0.5$  m above the fixed, smooth projection at A. If the coefficient of restitution of the impact is  $e = 0.4$  and  $b = 0.7$  m, what is the bar's angular velocity just after the impact? (20%)

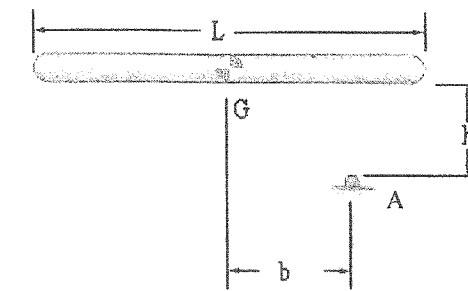


Fig. 4