

國立臺北科技大學 100 學年度碩士班招生考試

系所組別：1120、1131 機電整合研究所乙、丙組

第二節 工程力學 試題 (丙組選考)

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. The 1.2-m long slender bar of mass 6-kg is hinged at A in Fig. 1, starts from rest in the position shown and falls. When it has rotated counterclockwise through an angle of  $60^\circ$ , what is the maximum bending moment in the bar and where does it occur? (25%)

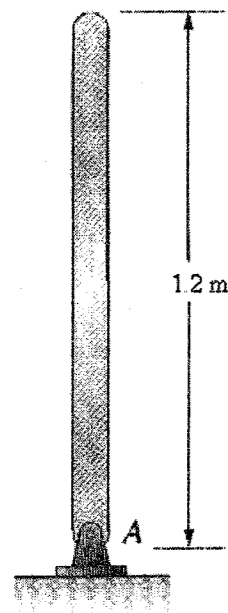


Fig. 1

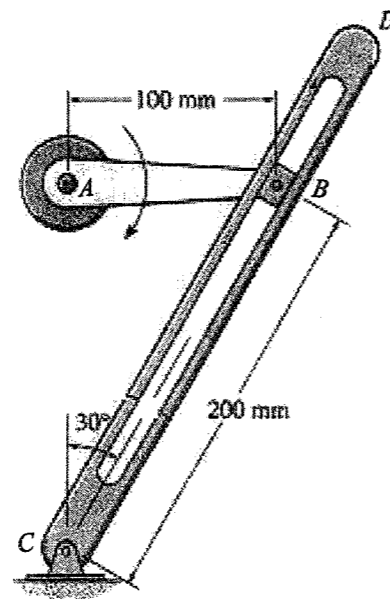


Fig. 2

2. Block B of the mechanism is confined to move within the slot member CD as shown in Fig. 2. At the instant shown, the crank AB is perpendicular to AC, and has a clockwise angular velocity  $\omega_{AB} = 3 \text{ rad/s}$  and a clockwise angular acceleration  $\alpha_{AB} = 1 \text{ rad/s}^2$ . Determine the angular velocity  $\omega_{CD}$  and angular acceleration  $\alpha_{CD}$  of member CD at the instant shown. (25%)

3. The 400-kg beam is supported at A and B when it is subjected to a force of 10 kN as shown in Fig. 3. If the pin support at A suddenly fails, determine the beam's initial angular acceleration and the force of the roller support at B on the beam. Does the beam still stay in contact with the roller support? For the calculation, assume that the beam is a slender rod so that its thickness can be neglected. (25%)

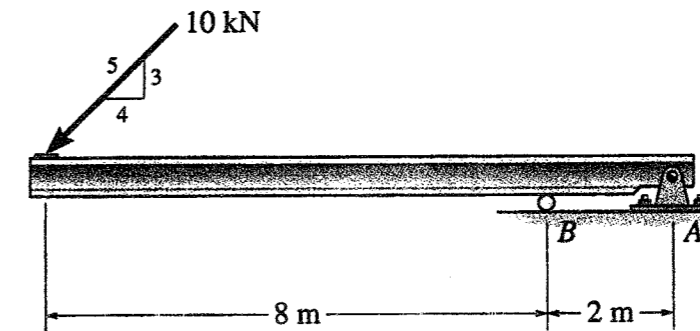


Fig. 3

4. A cord is wrapped around the rim of each 6-kg disk as shown in Fig. 4. If disk B is released from rest, determine the angular velocity of disk A in 2 seconds. Neglect the mass of the cord. (25%)

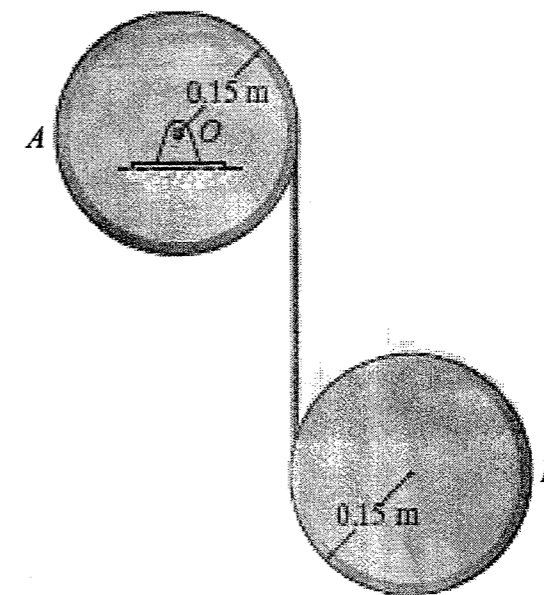


Fig. 4