

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. As shown in Fig. 1. The 4-kg collar C has a velocity of $v_A = 2 \text{ m/s}$ when it is at A . If the guide rod is smooth, determine the speed of the collar when it is at B . The spring has an unstretched length of $l_0 = 0.2 \text{ m}$. [20%]

註 1: 從 A 到 B 的導引桿是正圓弧狀。註 2: A 到彈簧轉軸 D 的垂直距離是 0.16 m 。

※重力方向朝下， $g=9.81\text{m/s}^2$

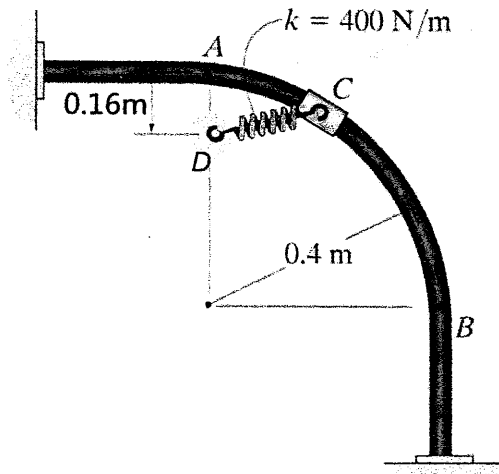


Fig.1

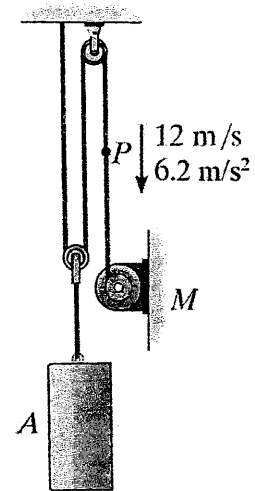


Fig.2

2. At the instant shown in Fig. 2, point P on the cable has a velocity $v_P = 12 \text{ m/s}$, which is increasing at a rate of $a_P = 6.2 \text{ m/s}^2$. Determine the power (Watt) input to motor M at this instant if it operates with an efficiency $\epsilon = 0.8$.

The mass of block A is 50 kg . [20%]

3. As shown in Fig. 3. End A of the link has a velocity of $v_A = 3.3 \text{ m/s}$. Determine the velocity of the peg at B at this instant. The peg is constrained to move along the slot. [20%]

※不考慮重力

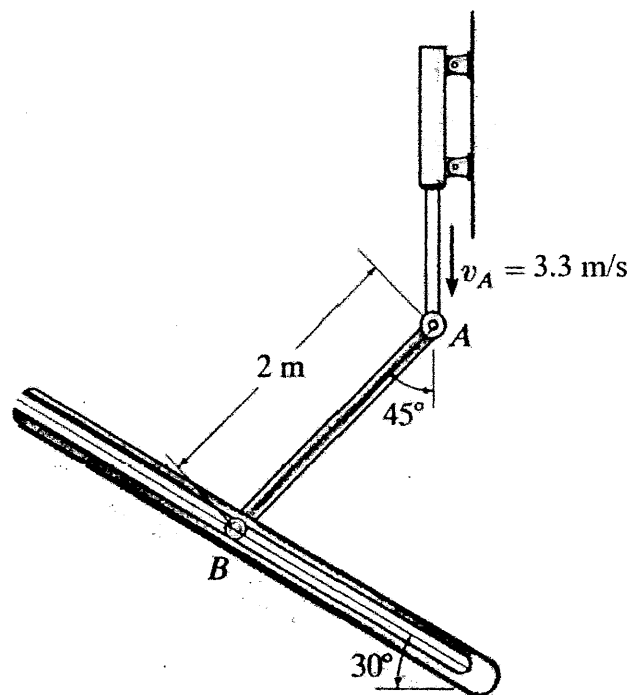


Fig. 3

4. At the instant shown in Fig. 4, the 30-kg disk has a counterclockwise angular velocity of $\omega=10$ rad/s. Determine the angular acceleration of the disk [10%] and the normal [5%] and tangential [5%] components of reaction of the pin O on the disk at this instant. ※重力方向朝下， $g=9.81\text{m/s}^2$

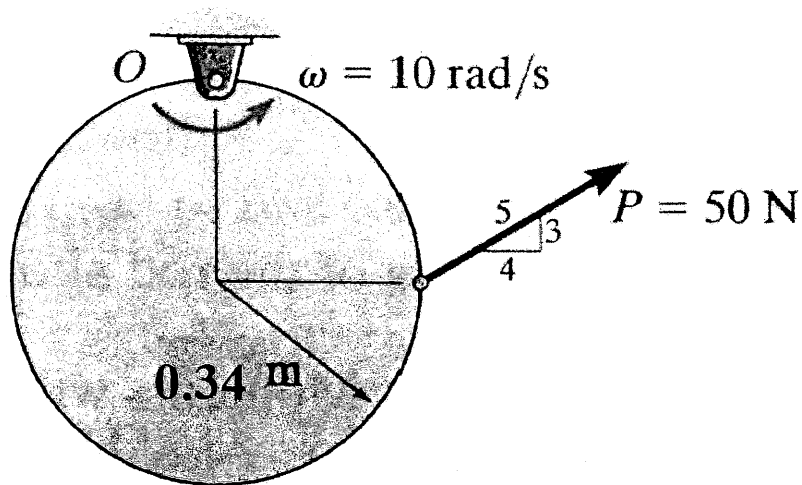


Fig. 4

5. The 10-kg wheel shown in Fig. 5 has a moment of inertia $I_G = 0.156$ kg·m². Assuming that the wheel does not slip or rebound, determine the minimum velocity v_G it must have to just roll over the obstruction at A. [20%]
 ※重力方向朝下， $g=9.81\text{m/s}^2$

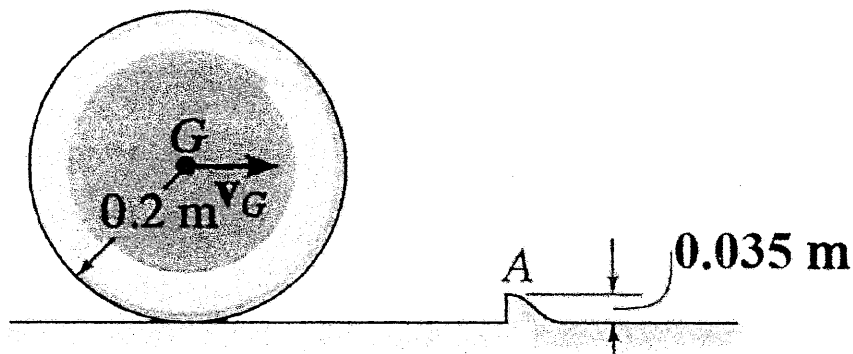


Fig. 5