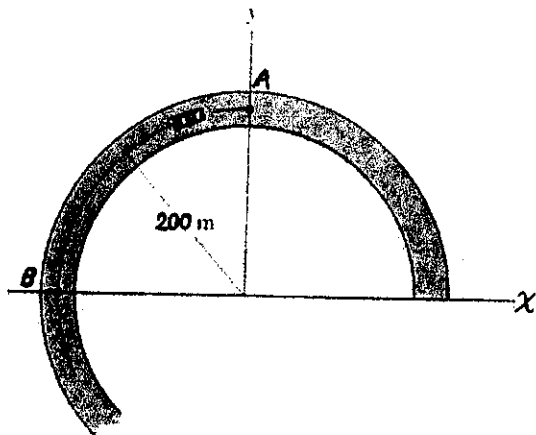


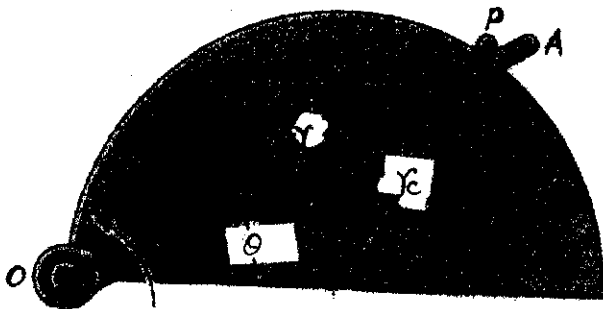
編號: F 178 系所: 系統及船舶機電工程學系乙組 科目: 動力學

本試題是否可以使用計算機:  可使用,  不可使用 (請命題老師勾選)

1. The race car travels around the circular track with a speed of 16 m/s. When it reaches point A it increases its speed at  $\dot{v} = \left(\frac{4}{3}v^{1/4}\right) \text{ m/s}^2$ , where  $v$  is in m/s.
- Determine the velocity and acceleration of the car when it reaches point B. (10%)
  - Also, how much time is required for it to travel from A to B? (10%)



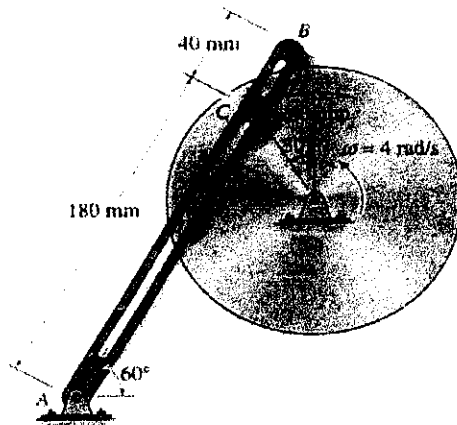
2. The particle of mass  $m$  is guided along the vertical circular path of radius  $r_c$  using the arm OA. If the arm has a constant angular velocity  $\dot{\theta}_0$ .
- Draw Free Body Diagram for particle P (5%)
  - Determine the angle  $\theta$  at which the particle starts to leave the surface of the semi-cylinder. (15%)



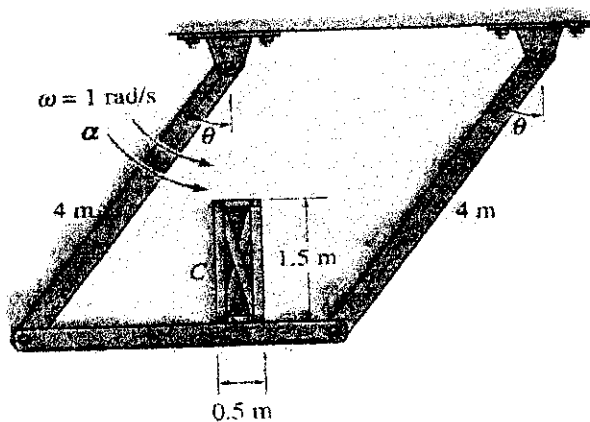
(背面仍有題目, 請繼續作答)

本試題是否可以使用計算機： 可使用， 不可使用 (請命題老師勾選)

3. If the slider block C is fixed to the disk that has a constant counterclockwise angular velocity of  $4 \text{ rad/s}$ , determine the angular velocity and angular acceleration of the slotted arm AB at the instant shown. (20%)



4. The 50-kg uniform crate rests on the platform for which the coefficient of static friction is  $\mu_s = 0.5$ . If at the instant  $\theta = 30^\circ$  the supporting links have an angular velocity  $\omega = 1 \text{ rad/s}$  and angular acceleration  $\alpha = 0.5 \text{ rad/s}^2$ , determine the friction force on the crate. (20%)



5. The disk has a mass  $m$  and radius  $r$ . If it strikes the rough step having a height  $\frac{1}{8}r$  as shown, determine the largest angular velocity  $\omega_1$  the disk can have and not rebound off the step when it strikes it. (20%)

