重庆大学《Kinematics and Kinetics》课程试

A卷 ○ B卷

2016 — 2017 学年 第 二 学期

开课学院：机械工程学院 课程号：ME30821 考试日期：＿＿＿＿＿

考试方式：○ 开卷 ◉ 闭卷 ○ 其他　　考试时间：120 分钟

题号	一	二	三	四	五	六	七	八	九	十	总 分
得分											

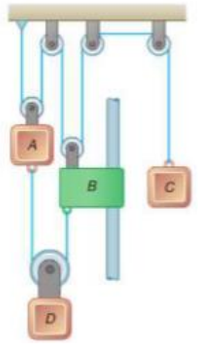
考试提示

1.严禁随身携带通讯工具等电子设备参加考试；

2.**考试作弊，留校察看，毕业当年不授学位；请人代考、替他人考试、两次及以上作弊等，属严重作弊，开除学籍。**

一、（15 分）

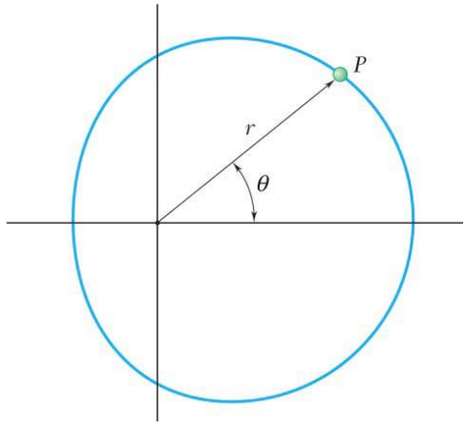
The system shown starts from rest, and each component moves with a constant acceleration. If the relative acceleration of block C with respect to collar B is 60 mm/s² upward and the relative acceleration of block D with respect to block A is 110 mm/s² downward, determine (a) the velocity of block C after 3s, (b) the change in position of block D after 5 s.



二、（20 分）

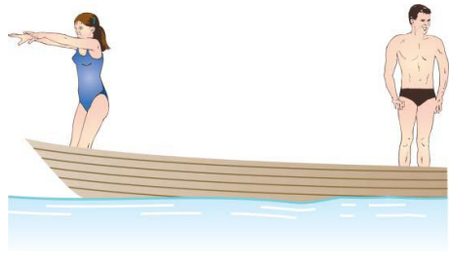
The path of a particle P is a limaçon. The motion of the particle is defined by the relations $r = b(2 + \cos \pi t)$ and $\theta = \pi t$, where t and θ are expressed in seconds and radians, respectively. Determine (a) the velocity and the acceleration of the particle when $t = 2s$, (b) the value of θ for which the magnitude of the velocity is maximum.

命题人：刘怀举　组题人：黄文彬　审题人：刘怀举
命题时间：2017 年 07 月 18 日　教务处制



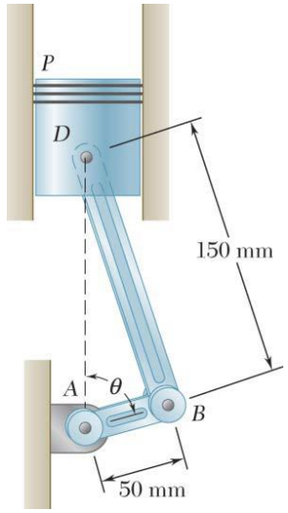
三、（15 分）

A 180 *lb* man and a 120 *lb* woman stand at opposite ends of a 300 *lb* boat, ready to dive, each with a 16 *ft/s* velocity relative to the boat. Determine the velocity of the boat after they have both dived, if (*a*) the woman dives first, (*b*) the man dives first.



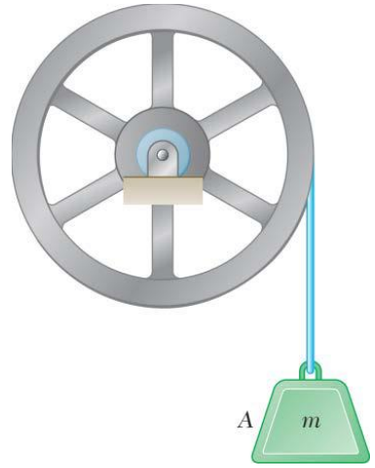
四、（15 分）

Knowing that crank AB rotates about Point A with a constant angular velocity of 900 rpm clockwise, determine the acceleration of the piston P when $\theta = 120°$.



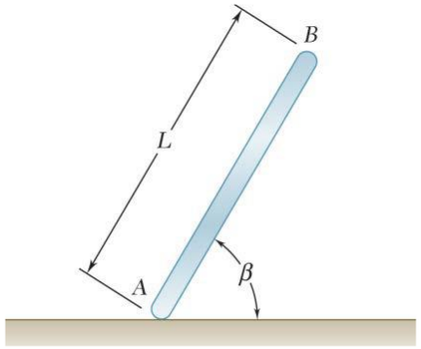
五、（15 分）

In order to determine the mass moment of inertia of a flywheel of radius 600 mm, a 12-kg block is attached to a wire that is wrapped around the flywheel. The block is released and is observed to fall 3 m in 4.6 s. To eliminate bearing friction from the computation, a second block of mass 24 kg is used and is observed to fall 3 m in 3.1 s. Assuming that the moment of the couple due to friction remains constant, determine the mass moment of inertia of the flywheel.



六、（20 分）

The uniform rod *AB* of weight *W* is released from rest when $\beta = 70°$. Assuming that the friction force between end *A* and the surface is large enough to prevent sliding, determine immediately after release (*a*) the angular acceleration of the rod, (b) the normal reaction at *A*, (c) the friction force at *A*.



七、Bonus（20 分）

For the structure as shown, given：OF = 4h/9, R = $\sqrt{3}$ h/3 and motion of the roller E is pure rolling without sliding. The rod AB has a constant velocity of $\bar{v}$ pointing to the left. At the position of φ= 60°, EF ⊥ OC. Please calculate (1) the instantaneous angular velocity of the rod OC: ω_{oc} and the roller E: ω_E, and (2) the angular acceleration of the roller E: α_{oc}.