國立成功大學

112學年度碩士班招生考試試題

編　號：133

系　所：航空太空工程學系

科　目：工程力學

日　期：0206

節　次：第 2 節

備　註：不可使用計算機

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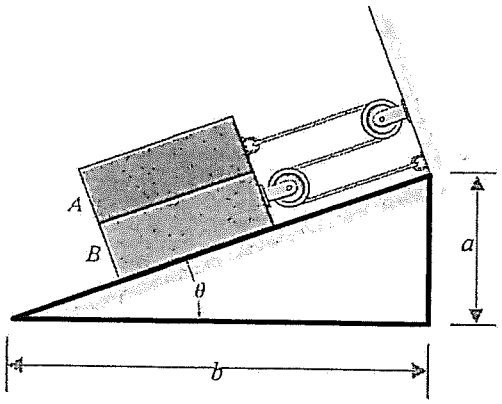
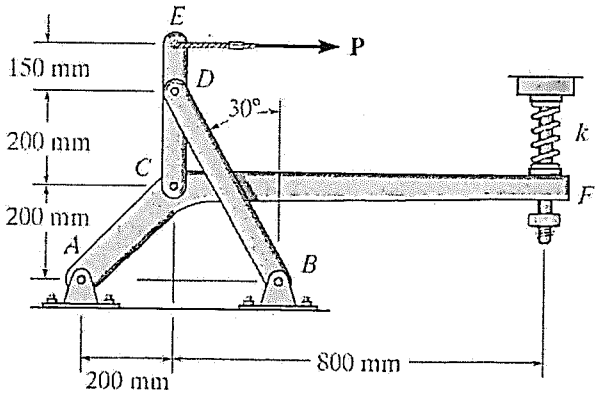
1. If the coefficient of static friction at contacting surface between blocks A and B is μ_s and that between block B and bottom is $2\mu_s$, determine the ratio a/b at which the identical blocks, each of weight W, begin to slide due to the effects of gravity. (25%)



2. Determine force **P** on the cable if the spring is compressed 0.05 m when the mechanism is in the position shown. The spring has a stiffness of $k = 600$ N/m. (25%)



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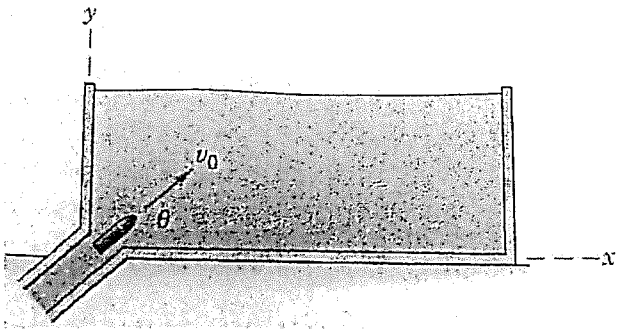
3. A projectile is ejected into a fluid at time $t = 0$ as shown. The initial speed is v_0 and the angle to the horizontal is θ. The drag on the projectile results in an acceleration $-kv$, where k is a constant and v is the velocity of the projectile. Include the effect of gravity g.

(a) Determine the x- and y-components of the velocity as a function of time.

(b) Find the terminal velocity for each of the x- and y-components. (25%)



4. A simple pendulum of mass m and length r is mounted on the flatcar which has a constant acceleration a_0 as shown. If the pendulum is released from rest relative to the flatcar at the position $\theta = 0$, determine the expression for the tension T in the supporting rod for any value of θ. Include the effect of gravity g. (25%)