

## 淡江大學 106 學年度碩士班招生考試試題

系別：航空太空工程學系 B 組 科目：動力學

考試日期：3 月 4 日(星期六) 第 2 節

本試題共 4 大題， 2 頁

本試題雙面印刷

1. Two blocks are joined by an inextensible cable as shown in *Figure 1*. If the system is released from rest, determine the velocity of block *A* after it has moved 2 m. Assume that the coefficient of friction between block *A* and the plane is  $\mu_k = 0.25$  and that the pulley is weightless and frictionless. **Hint:** (1) Apply the principle of work and energy separately to blocks *A* and *B*. (2) When the two relations are combined, the work of the cable forces cancel. (3) Solve for the velocity. (25%)

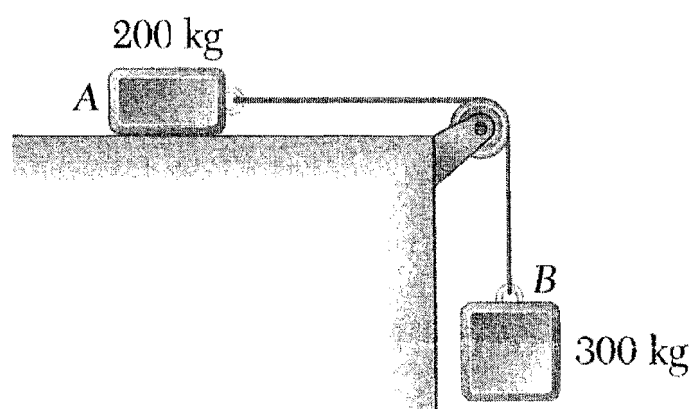


Figure 1.

2. The bob of a 2-m pendulum describes an arc of a circle in a vertical plane as shown in *Figure 2*. If the tension in the cord is 2.5 times the weight of the bob for the position shown, find the velocity and acceleration of the bob in that position. Please resolve the equation of motion for the bob into tangential and normal components. (25%)

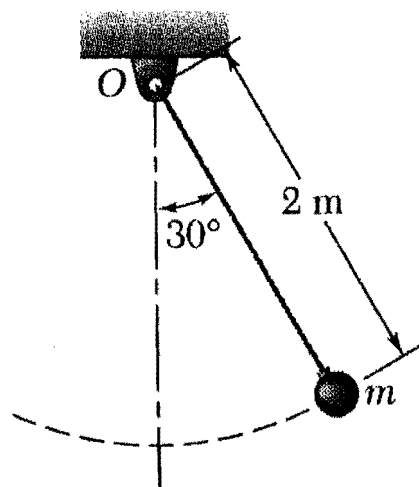


Figure 2.

背面尚有試題

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3. The crank  $AB$  has a constant clockwise angular velocity of  $209.4 \text{ rad/s}$ . For the crank position indicated as shown in *Figure 3*, determine (a) the angular velocity of the connecting rod  $BD$ , and (b) the velocity of the piston  $P$ . Note that the angle between the horizontal and the connecting rod can be obtained from the law of sines and is given as  $\beta = 13.95^\circ$ . (25%)

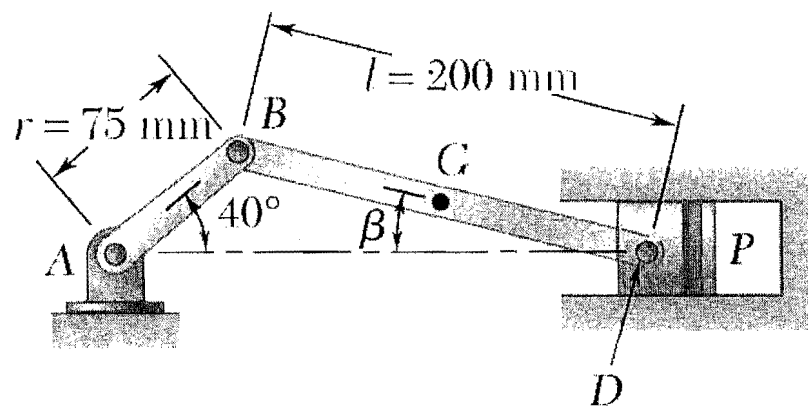


Figure 3.

4. A uniform slender rod of length  $L = 1 \text{ m}$  and weight  $W = 2 \text{ kg}$  hangs freely from a hinge at  $A$ . If a force  $\vec{P}$  of magnitude  $8 \text{ N}$  is applied at  $B$  horizontally to the left ( $h = L$ ) as shown in *Figure 4*, determine (a) the angular acceleration of the rod, (b) the components of the reaction at  $A$ . (25%)

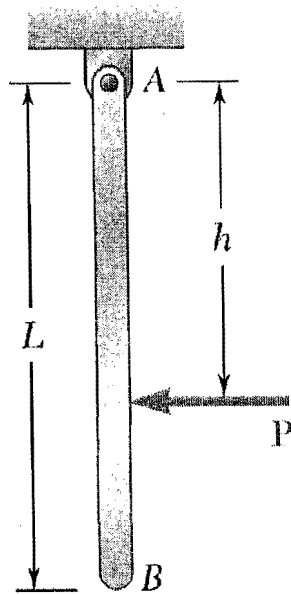


Figure 4.