

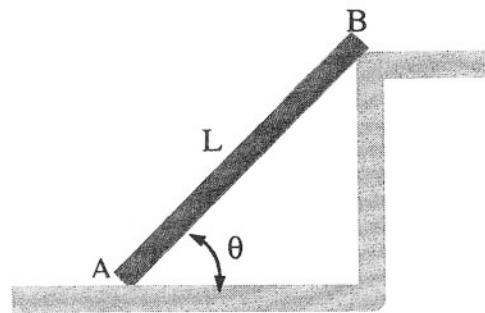
國立清華大學命題紙

96學年度 動力機械 系(所) 丙·丁 組碩士班入學考試

科目 應用力學 科目代碼 1302 1202 共 3 頁第 1 頁 \*請在【答案卷卡】內作答

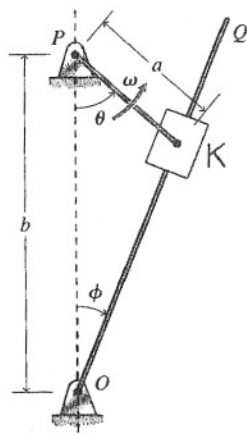
(請依題號順序在答案紙上)  
解答, 不要亂跳

1. As figure shown, the uniform rod having a weight  $W$  and length  $L$  is supported at its ends A and B, where the coefficient of static friction is  $\mu$ . (a) Draw the free body diagram, (b) write down the Equations of Friction and Equilibrium, and (c) determine the greatest angle  $\theta$  so the rod does not slip. (25%)



2. A point moves on a path defined by  $x=2t^2$ ,  $y=t^3$  where  $t$  is in seconds and both  $x$  and  $y$  are in meters. Determine its normal acceleration for  $t=1$ . (12%)

3. In the following figure, let  $a=20$  mm,  $b=80$  mm, and  $\omega=120$  rpm counterclockwise. For  $\theta=90^\circ$ , calculate the angular velocity of link  $OQ$ . (13%)

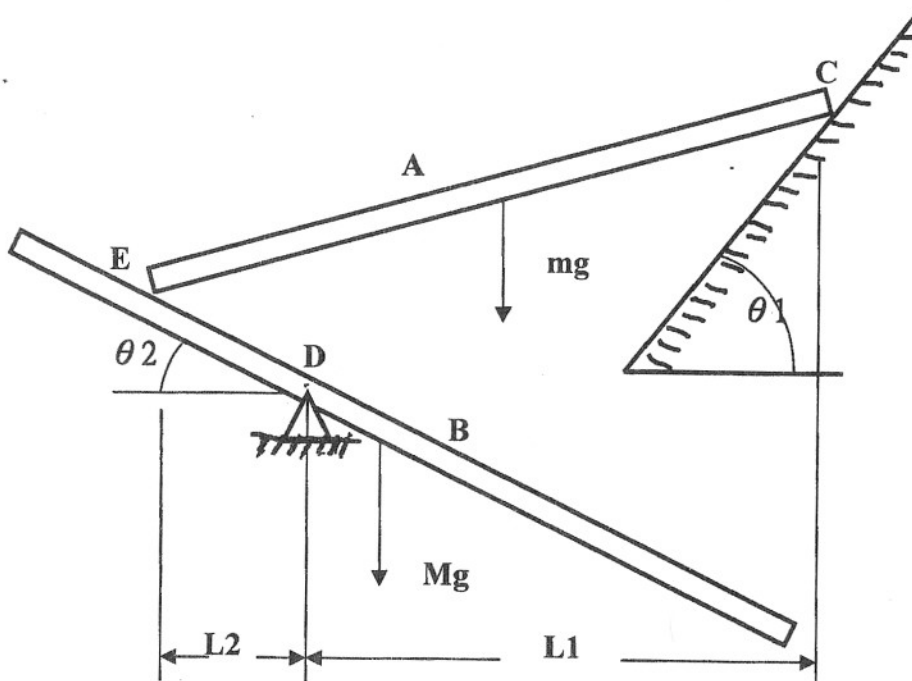


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4. A structure is shown as following, A uniform bar A has a weight of  $mg$  and a length of  $L_A$ , a uniform bar B has a weight of  $Mg$  and a length of  $L_B$ . A hinge is attached on  $1/3$  length of the bar B at point D. One side of bar A is attached on a frictionless inclined surface at point C and the other side is attached with bar B at point E. The distance between C and D is  $L_1$ . Assume all contact surfaces are frictionless. The incline angle of incline surface is  $\theta_1$  and the incline angle of bar B is  $\theta_2$ . If the system is under equilibrium condition, find the relation between  $\theta_2$  and  $L_2$ . (25%)



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5. A stick whose mass and length are 100g and 100cm can rotate about an axis through one end O, as shown in figure. Suppose that the stick starts from a vertical position and falls to the horizontal position where it strikes a fixed inelastic rod at a distance of 60cm from the pivot O. Find (a) the impulse of the blow on the fixed inelastic rod, and (b) the impulse of the reaction at the support O. (25%) (The impulse should be given as a vector form  $ai+bj$ . Where  $i$  and  $j$  represent the unit vectors of the coordinates  $x$  and  $y$ .)

