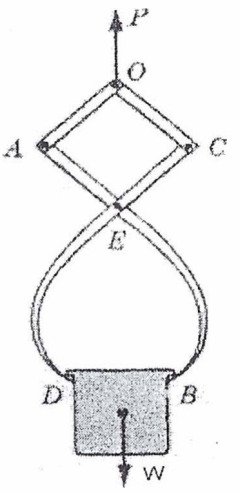
國　立　清　華　大　學　命　題　紙

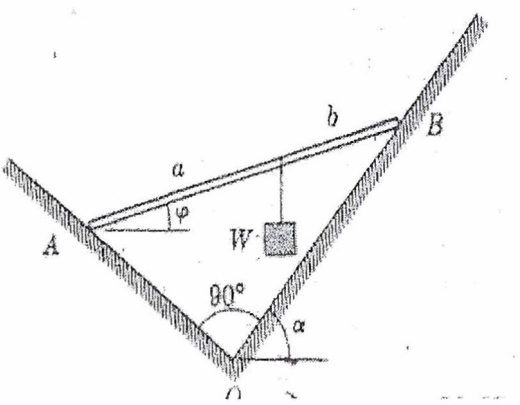
95 學年度　動力機械工程 系（所）丙、丁 組碩士班入學考試

科目 應用力學（含靜、動力學） 科目代碼 1702,1802 共 3 頁第 1 頁 *請在【答案卷卡】內作答

1. For the load shown in the figure, determine the force acting on the pin E of the lifting tongs. Where OA = OC = AE = CE, BE = DE = 2AE. In the position shown OAEC forms a square, and angle BED is θ, weight is W. **(20%)**



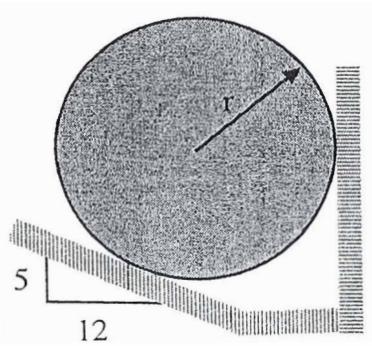
2. A rigid bar AB of negligible weight is supported in a vertical plane by two smooth surfaces which are perpendicular to each other. A weight W is hung on the bar, as shown in the figure. Determine the angle φ defining the position of equilibrium. **(15%)**



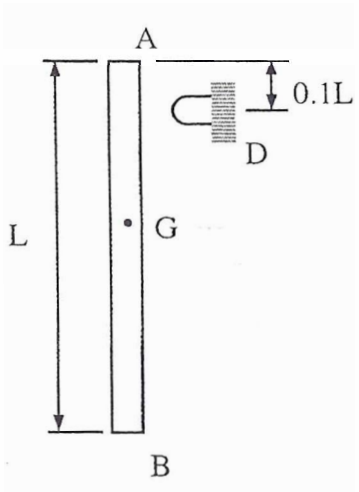
3. The wheel in figure below has a mass of M kg and a radius of r meter. The friction coefficient between the wheel and the inclined floor is 0.50, and the vertical wall is smooth. Determine the couple C acting on the wall that will result in impending motion, (20%)

   (a) If the couple is clockwise.

   (b) If the couple is counterclockwise.



4. The slender homogeneous bar AB in figure below is rotating about its mass center G with an angular velocity ω clockwise when it strikes the rigid stop at D. The coefficient of restitution for AB and D is 0.75. Determine the angular velocity of AB and the linear velocity of G just after impact. (15%)



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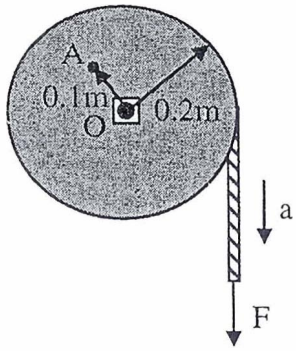
5. A cord is wrapped around a wheel (0.2m in radius), which is initially at rest, as in figure below. If a force F is applied to the cord and gives it an acceleration of $a=(4t)$ m/s^2 , where t is in seconds, determine (a) the angular velocity of the wheel at t=1 s, (b) the magnitudes of velocity and acceleration of point A at t=1 s, and (c) the number of revolutions the wheel makes during the first second. **(15%)**



6. A long strip of paper is wrapped into two rolls, each having a mass of 8 kg. Roll A is pin-supported about its center, whereas roll B is not centrally supported. If B is brought into contact with A and released from rest, determine the initial tension in the paper between the rolls, and the angular acceleration of each roll. For the calculation, assume the rolls to be approximated by cylinder, and g=10 m/s^2. **(15%)**