國立中正大學
111 學年度碩士班招生考試
試 題

[第 1 節]

科目名稱	動力學
系所組別	機械工程學系-甲組

一作答注意事項一

※作答前請先核對「試題」、「試卷」與「准考證」之系所組別、科目名稱是否
　相符。

1.預備鈴響時即可入場,但至考試開始鈴響前,不得翻閱試題,並不得書寫、
　畫記、作答。

2.考試開始鈴響時,即可開始作答;考試結束鈴響畢,應即停止作答。

3.入場後於考試開始 40 分鐘內不得離場。

4.全部答題均須在試卷(答案卷)作答區內完成。

5.試卷作答限用藍色或黑色筆(含鉛筆)書寫。

6.試題須隨試卷繳還。

1. A 2-kg pendulum bob moves in the vertical plane with a velocity of 6 m/s when θ= 0 degree. Determine the angle θ where the tension in the cord becomes zero. (25 %)
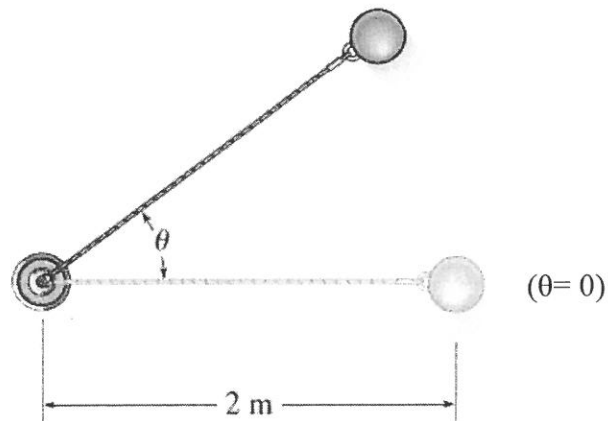

Figure 1

2. Member AB has the angular motions shown in Figure 2.
   (a) Determine the velocity and acceleration of the point B at this instant. (10 %)
   (b) Determine the velocity and acceleration of the slider block C at this instant. (15 %)
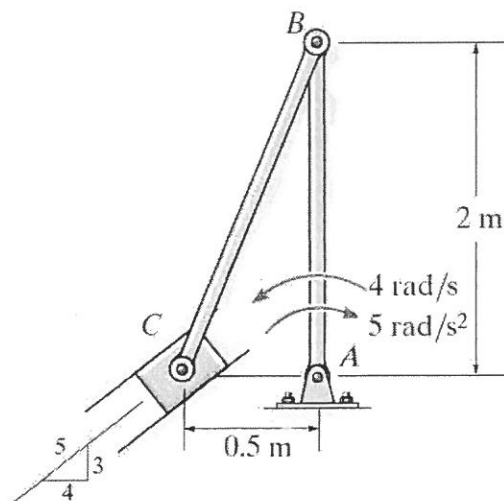

Figure 2

3. The disk shown in Figure 3 has a mass of 20 kg and is originally spinning at the end of the strut with an angular velocity of $\omega = 60 \ rad/s$. If it is then placed against the wall, where the coefficient of kinetic friction is $\mu_k = 0.3$.
    (a) Determine the moment of inertia I_B (5 %)
    (b) Determine the force in strut BC. (10 %)
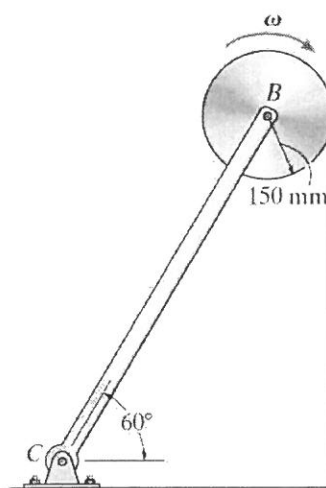   (c) Determine the time required for the motion to stop. (10 %)

Figure 3

4. A disk has mass 30-kg and radius of gyration $k_G = 0.35$m is originally at rest, and the spring is unstretched. A couple moment of M = 80 Nm is then applied to the disk as shown. Determine its angular velocity when its mass center G has moved 0.5 m along the plane. The disk rolls without slipping and the coefficient of kinetic friction between the disk and the surface of the ground is 0.2. (25 %)
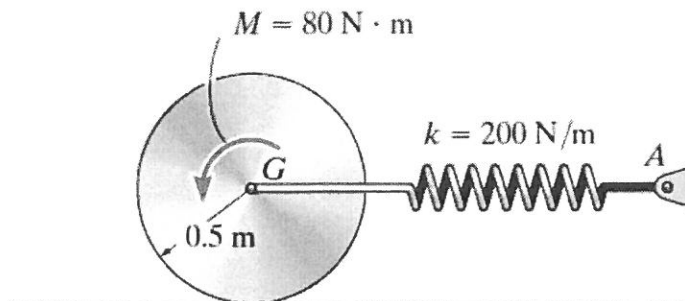

Figure 4