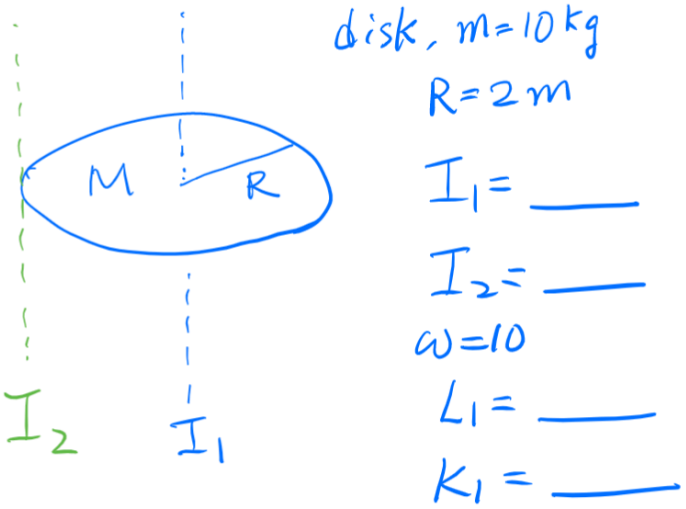
GP1-LQA10 學號:_____ 系級:_____姓名: _____ 得分:_____

力 萬 求
行 信 真

填充,計算題須寫出計算過程,並且將答案填入空格。

Problem 1

A disk of mass=10 kg and radius=2 m. It rotates about an axis passes though its center and normal to the disk. The angular speed of the disk is $\omega = 10$ rad/s. Find the following quantities. 質量為10 kg的圓盤，半徑為2 m。它繞經過其中心且垂直於磁盤的軸旋轉，圓盤的角速度為 ω=10 弧>度/秒。(a)通過質心轉動軸的轉動慣量I_1，(b)此圓盤的角動量L_1，(c)圓盤的轉動動能K_1，(d)假如轉動軸平移到盤 子的邊緣，擇期轉動慣量I_2=___? (04小題) 01 (a)I_1=____ 分數= 5 02 (b)L_1=____ 分數= 5 03 (c)K_1=____ 分數= 5 04 (d)the rotational axis is shifted to the edge, I_2=____ 分數= 5



Problem 2

A 140 kg disk rolls along a horizontal floor so that the disk's center of mass has a speed of 0.150 m/s. (a)How much work must be done on the disk to stop it? (b)Find the ratio of the rotational kinetic energy to the total kinetic energy. 一塊140公斤的盤子沿水平地板滾動，盤子的質心速度為0.150 m/s。 （a）要在盤子停止，必須完做多少功？ （b）求出旋 轉動能與總動能之比。 (02小題) 05 (a)the magnitude of the work, |W|=___ J 分數= 8 06 (b)the ratio=___ 分數= 7

Problem 3

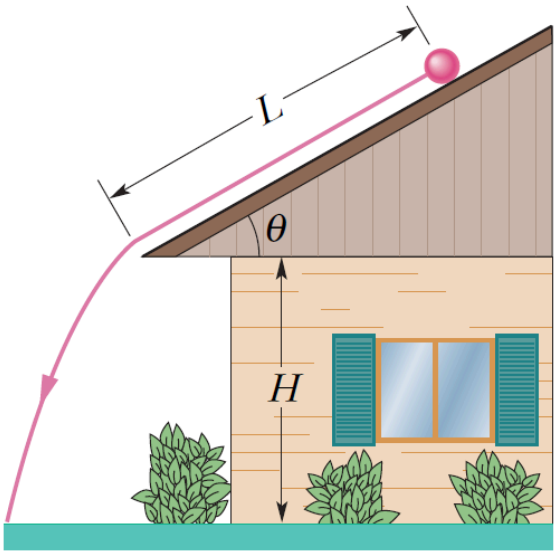
A hollow sphere of radius 0.15 m, with rotational inertia I = 0.040 kg.m^2 about a line through its center of mass, rolls without slipping up a surface inclined at 30° to the horizontal. At a certain initial position, the sphere's total kinetic energy is 20 J. (a)Find its initial rotational kinetic energy.
(b) What is the speed of the center of mass of the sphere at the initial position?
When the sphere has moved 1.0 m up the incline from its initial position, what are
(c) its total kinetic energy K_f and
(d) the speed $v_{com,f}$ of its center of mass?

Given that the rotational inertia of a hollow sphere (shell) is $\frac{2}{3}MR^2$. 半徑為0.15 m，旋轉慣性I = 0.040 kg.m ^{2}的空心球繞著穿過其質心的直線滾動，在傾角30°的表面向上滾動而不滑動。在初始>位置球的總動能為20 J。(a）求其初始旋轉動能。(b）在初始位置，球的質心的速度是多少？
當球體從其初始位置向斜面上>滾動1.0 m時，(c）其總動能K_f和（d）其質心速度$v_{com,f}$是多少？
空心球（殼）的旋轉慣量為$\frac{2}{3}MR^2$。 (04小題) 07 (a)initial K_{rot}=____ J 分數= 5 08 (b)initial v_{com}=____ m/s 分數= 5 09 (c)K_f=_____ J 分數= 5 10 (d)$v_{com,f}$=_____ m/s 分數= 5

Problem 4

In the figure, a solid cylinder of radius R and mass M starts from rest and rolls without slipping a distance L down a roof that is inclined at the angle θ=theta. (a)What is the angular speed of the cylinder about its center as it leaves the roof? (b)Find the vertical speed of the cylinder as it leaves the roof.

在圖中，半徑為R和質量為M的實心圓柱體，從靜止狀態開>始滾動，並且沿傾斜角度為θ的屋頂向下滑動距離L，不會滑動 θ= theta。 （a）圓柱離開屋頂時繞其中心>的角速度是多少？ (b)圓柱體滾到離開屋簷時垂直方向的速度為多少？ (02小題)



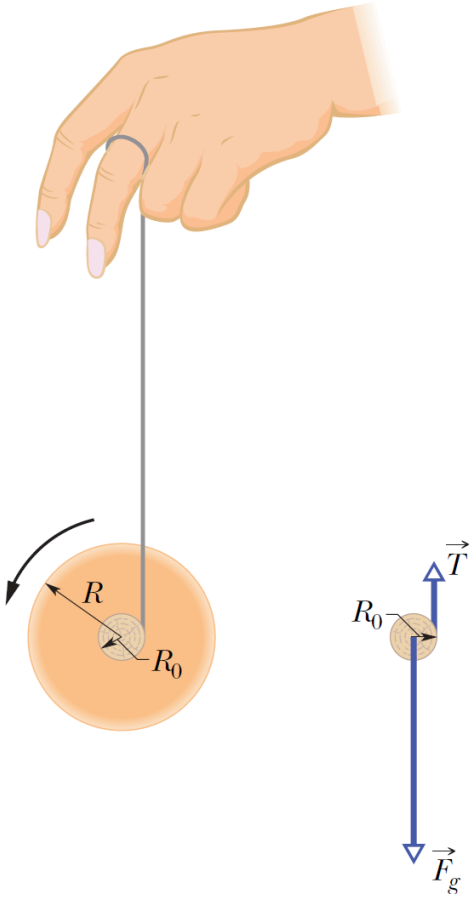
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11 (a)the angular speed, ω=____ [M,R,g,L,theta] 分數= 8

12 (b)the vertical speed of the cylinder as it leaves the roof, v_y =____ [M,R,g,L,theta] 分數= 7

Problem 5

In the figure, a yo-yo has a mass of M. Its axle radius is R_0, and its string is L. The radius of the yo-yo R=4R_0. The yo-yo rolls from rest down to the end of the string. (a) What is the magnitude of its linear acceleration? (b) How long does it take to reach the end of the string? As it reaches the end of the string, what are its (c) linear speed, (d) translational kinetic energy, (e) rotational kinetic energy, and (f) angular speed? 在圖中，溜溜球的質量為M。其軸半徑為R_0，其繩子的長度為L。溜溜球的半徑R = 4R_0。 悠悠球從靜止滾動到繩子的盡頭。 （a）線性加速度的大小是多少？ （b）到達繩子末尾需要多長時間？ 當它到達繩子的末端時，>它的（c）線速度，(d）平移動能，(e）旋轉動能和（f）角速度是多少？ (06小題)



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13 (a)a=___ [g] 分數= 5

14 (b)t=___ [g,L] 分數= 5

15 (c)v=___ [g,L] 分數= 5

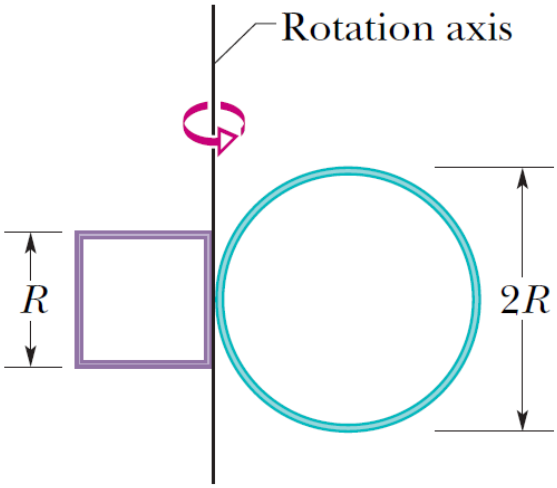
16 (d)K_{tr}=____ [M,g,L] 分數= 5

17 (e)K_{rot}=____ [M,g,L] 分數= 5

18 (f)ω=____ [g,L,R_0] 分數= 5

Problem 6

The figure shows a rigid structure consisting of a circular hoop of radius R and mass 2m, and a square made of four thin bars, each of length R and mass m. The rigid structure rotates at a constant speed about a vertical axis, with a period of rotation of T. Calculate (a) the structure's rotational inertia about the axis of rotation and (b) its angular momentum about that axis.
該圖顯示>了一個剛體，該結構由半徑為R和質量為2m的圓形箍，和由四個分別為長度R和質量m的細棒製成的正方形組成。剛體以旋轉週期T，以 恆定的速度繞垂直軸旋轉。計算(a)剛體繞旋轉軸的旋轉慣量和(b)繞該軸的角動量。 (03小題)



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19 (a)I=____ [m,R] 分數= 5

20 (b)angular momentum, L=_____ [m,R,T] 分數= 5

21 (c)If the outer vertical bar of the square is pulled back to the rotational axis, the final angular speed ω_f =____ [T] 分數= 5