GP1-LQA9 學號:_____ 系級:_____姓名: _____ 得分:_____

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填充,計算題須寫出計算過程,並且將答案填入空格。

Problem 1

The angular position of a point on the rim of a rotating wheel is given by $\theta(t) = 4.0t^3 - 3.0t^2 + t$, where θ is in radians and t is in seconds. What are the angular velocities at (a) t = 2.0 s and (b) t = 4.0 s? (c) What is the average angular acceleration for the time interval that begins at t = 2.0 s and ends at t = 4.0 s? What are the instantaneous angular accelerations at (d) the beginning and (e) the end of this time interval? (05小題) 01 (a) $\omega(2)$=_____ rad./s 分數= 3 02 (b)$\omega(4)$=_____ rad./s 分數= 3 03 (c)the average angular acceleration=_____ rad./s 分數= 3 04 (d)$\alpha(2)$=_____ rad./s^2 分數= 3 05 (e)$\alpha(4)$=_____ rad./s^2 分數= 3

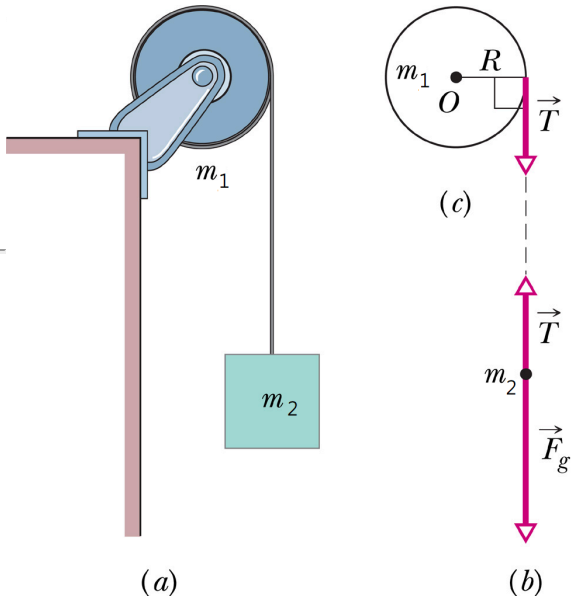
Problem 2

The figure shows a uniform disk, with mass m_1 and radius R, mounted on a fixed horizontal axle. A block with mass m_2 hangs from a massless cord that is wrapped around the rim of the disk. Find (a)the acceleration of the falling block and (b)the tension in the cord. The cord does not slip, and there is no friction at the axle. (02小題)

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06 (a)the magnitude of the acceleration of the block, $|a|$ =_____ [m_1,m_2,g] 分數= 8

07 (b)the tension in the cord=_____ [m_1,m_2,g] 分數= 7



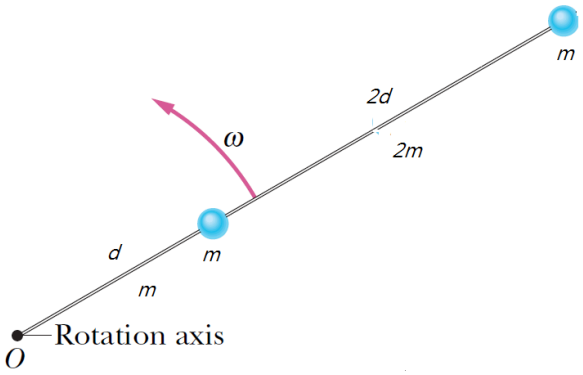
Problem 3

A diver makes 5 revolutions on the way from a 20 m high platform to the water. Assuming zero initial vertical velocity, find (a)the time of flight of the diver and (b)the average angular velocity during the dive.

(02小題) 08 (a)the time of flight=_____ s 分數= 5 09 (b)the average angular velocity=_____rad/s 分數= 5

Problem 4

In the figure, two particles, each with mass m, are fastened to each other, and to a rotation axis at O, by two thin rods. The near rod is with length d and mass m while the other with length 2d and mass 2m. The combination rotates around the rotation axis with angular speed ω=omega. Measured about O, what are the combination's (a) rotational inertia and (b) kinetic energy? (02小題)



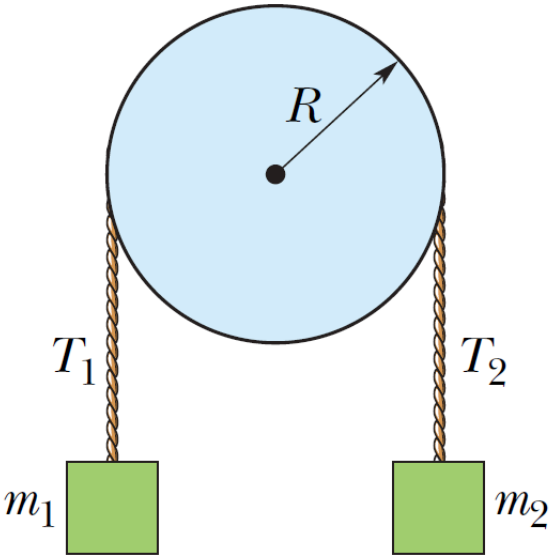
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10 (a) rotational inertia=____ [m, d] 分數= 8

11 (b) kinetic energy=_____ [m, d, omega] 分數= 7

Problem 5

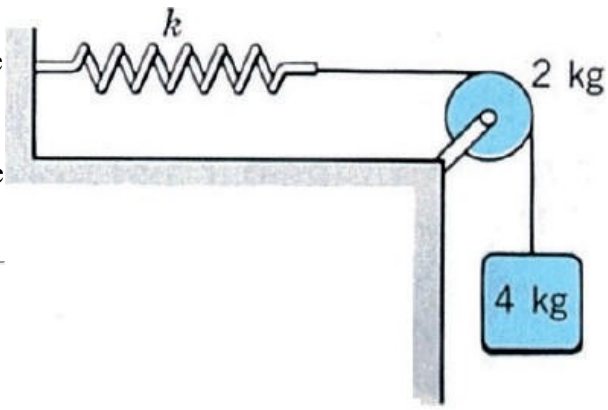
In the figure, block 1 has mass $m_1 = 0.46$ kg, block 2 has mass $m_2 = 0.5$ kg, and the pulley, which is mounted on a horizontal axle with negligible friction, has radius $R = 0.05$ m. When released from rest, block 2 falls 75.0 cm in 5.00 s without the cord slipping on the pulley. (a) What is the magnitude of the acceleration of the blocks? What are (b) tension T_2 and (c)tession T_1 ? (d) What is the magnitude of the pulley's angular acceleration? (e) What is its rotational inertia?



(05小題) 12 (a)the magnitude of the acceleration of the blocks=_____ m/s^2 分數= 4 13 (b)tension T_2=_____ N 分數 = 4 14 (c)tession T_1=_____ N 分數= 4 15 (d)the magnitude of the pulley's angular acceleration=_____ rad/s^2 分數= 4 16 (e)its rotational inertia=_____ kg.m^2 分數= 4

Problem 6

The figure shows a block of mass m suspended by a rope that passes over a pulley of radius R) and moment of inertia I. The rope is connect to a spring whose stiffness constant is k. (a) If the block is released from rest, what is the maximum extensionx_m of the spring? (b) what is the angular speed of the pulley after the block has fallen $x = \frac{1}{2}x_m$? (02小題)



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17 (a)x_m=_____ [m,g,k,R,I] 分數= 5

18 (b)v=_____ [m,g,k,R,I] 分數= 10

Problem 7

What are the magnitudes of (a) the angular velocity, (b) the radial acceleration, and (c) the tangential acceleration of a spaceship taking a circular turn of radius 4000 km at a constant speed of 30000 km/h? (03小題) 19 (a)ω=____ rad./s 分數= 5 20 (b)radial acceleration, a_r=_____ m/s^2 分數= 5 21 (c)tangential acceleration, a_t=_____ m/s^2 分數= 5

Problem 8

A flywheel of radius 20 cm starts from rest, and has a constant angular acceleration of 60 rad/s^2. Find: (a)tangential acceleration, (b)radial acceleration; (c)the magnitude of the net linear acceleration of a point on the rim after 0.15 s; (d) the number of revolutions completed in 2 s. 半徑為20 cm的飛輪從靜止開始，並具有60 rad/s^{2}的恆定角加速率。 計算：0.15 s後輪邊緣上點的(a)切線加速度，(b)向心加速度，(c)淨線性加速度的大小；(d)在2秒內完成的圈數。 (04小題) 22 (a)tangential acceleration=_____ m/s^2 分數= 4 23 (b)radial acceleration=_____ m/s^2 分數= 4 24 (c)net acceleration=_____ m/s^2 分數= 4 25 (d)the number of revolutions=_____ 分數= 4