'Pendulum Dʒː[`pendjuləm]單擺 （複數 pendulums)

Sus'pension 懸掛、懸吊。暫停、中止

‘Frequency 頻率。 Frequent 頻繁的、時常發生的

Vi'bration n.振動、顫動.‘vibrate v.

‘Amplitude [物理學]振幅。廣大、廣闊、充足。

As'sume 假定為、（想當然地）認為。承擔、就任。

55. **S** A pendulum of length L and mass M has a spring of force constant k connected to it at a distance h below its point of suspension (Fig. P15.55). Find the frequency of vibration of the system for small values of the amplitude (small θ). Assume the vertical suspension rod of length L is rigid, but ignore its mass.
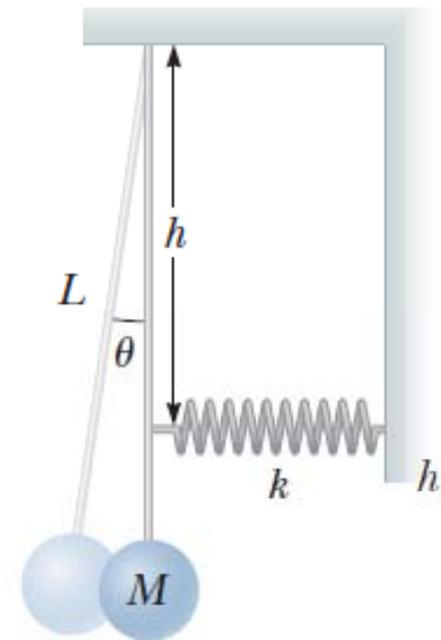

Figure P15.55

'rigidly 牢牢地,緊緊地.嚴格地;固執地。　lo'cated at 位於、座落於 edge 邊,棱;邊緣.刀口.優勢.　As'sembly (機械的)裝配.集會;集合 equi'librium 平衡。　　'period **DJ**：[`piəriəd]時期,期間.【美】句號

72. **S** A smaller disk of radius r and mass m is attached rigidly to the face of a second larger disk of radius R and mass M as shown in Figure P15.72. The center of the small disk is located at the edge of the large disk. The large disk is mounted at its center on a frictionless axle. The assembly is rotated through a small angle θ from its equilibrium position and released. (a) Show that the speed of the center of the small disk as it passes through the equilibrium position is

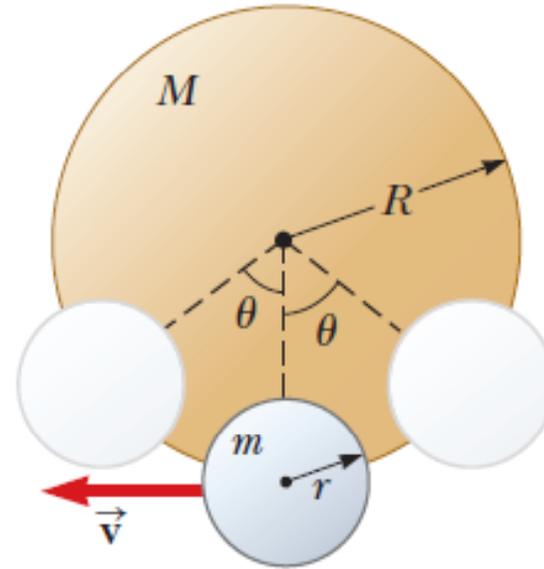$$v = 2\left[\frac{Rg(1 - \cos\theta)}{(M/m) + (r/R)^2 + 2}\right]^{1/2}$$

Figure P15.72

(b) Show that the period of the motion is

$$T = 2\pi\left[\frac{(M + 2m)R^2 + mr^2}{2mgR}\right]^{1/2}$$

'oscillate v.【物】振盪. osci'llation n.

'simple har'monic 'motion (SHM) 簡諧運動

track 軌道;足跡

'portion (一)部分

In phase 同相

'segment 部分;部門;切片,斷片

75. **S** A block of mass M is connected to a spring of mass m and oscillates in simple harmonic motion on a frictionless, horizontal track (Fig. P15.75). The force constant of the spring is k, and the equilibrium length is ℓ. Assume all portions of the spring oscillate in phase and the velocity of a segment of the spring of length dx is proportional to the distance x from the fixed end; that is, $v_x = (x/\ell)v$. Also, notice that the mass of a segment of the spring is $dm = (m/\ell)dx$. Find (a) the kinetic energy of the system when the block has a speed v and (b) the period of oscillation.
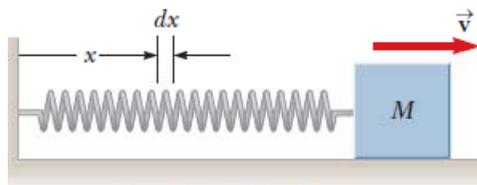

Figure P15.75