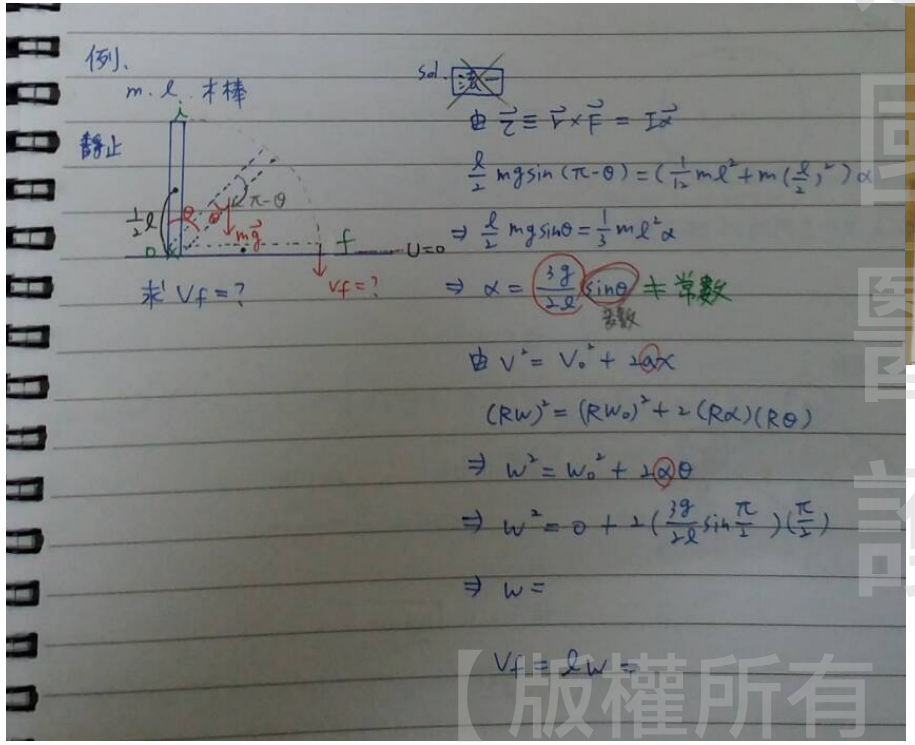
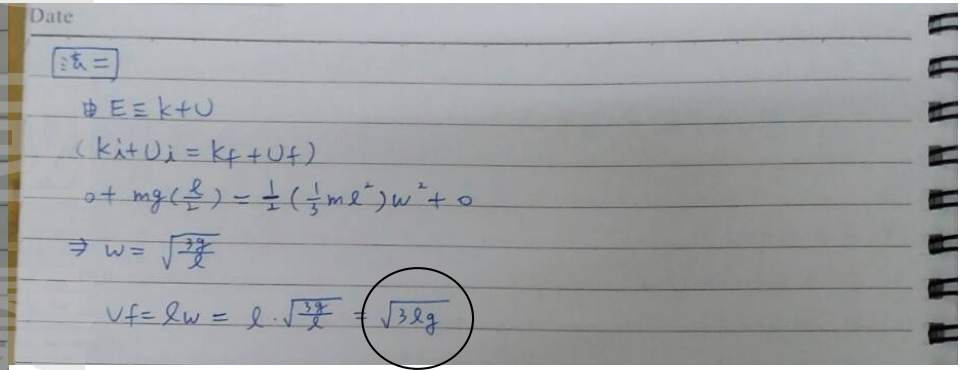
107 高醫《物理》命中事實

出自於程量子上課筆記，相似度100%

3. A thin uniform rod of mass M and length L is positioned vertically above an anchored frictionless pivot point, as shown below, and then allowed to fall to the ground. At what speed does the free end of the rod strike the ground?

(A) $\sqrt{\frac{1}{3}gL}$ (B) $\sqrt{gL}$ (C) $\sqrt{3gL}$ (D) $\sqrt{12gL}$ (E) $12\sqrt{gL}$





上課分析兩種解題方式，訓練同學們的思考能力

出自於程量子上課講義，相似度90%

4. A disk with a radius of 2.0 m and a rotational inertia of 0.40 kg·m^2 rotates with an angular speed of 4.0 rad/s around a frictionless vertical axle. A wade of clay (m = 25 g) drops onto and sticks to the edge of the disk. What is the new angular speed of the disk?

(A) 3.2 rad/s (B) 3.6 rad/s (C) 2.7 rad/s (D) 1.1 rad/s (E) 0.67 rad/s

6-26 A disk (mass M, radius R) rotates about an axis perpendicular to the disk and through its center. When its angular velocity equals ω_d a particle of the same mass M, initially at rest, becomes attached to a point on the rim of the disk. If no external torque, what is the new kinetic energy of the system?

解

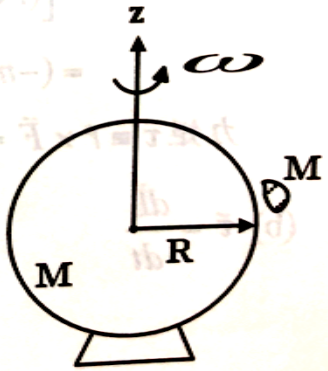
結合前與結合後系統之角動量守恆

$$I_d\omega_d = (I_d + I_p)\omega$$

$$\Rightarrow (\frac{1}{2}MR^2)\omega_d = (\frac{1}{2}MR^2 + MR^2)\omega$$

$$\Rightarrow \omega = \frac{1}{3}\omega_d$$

結合後系統之動能



$$K_{rot} = \frac{1}{2}(I_d + I_p)\omega^2 = \frac{1}{2}(\frac{1}{2}MR^2 + MR^2)(\frac{1}{3}\omega_d)^2 = \frac{1}{12}MR^2\omega_d^2$$

出自於程量子平時作業，相似度90%

38. A single conservative force $F(x)$ acts on a particle that moves along an x axis. The particle has mass of 2.0 kg. The potential energy $U(x)$ associated with $F(x)$ is described by $U(x) = -(2.0)xe^{-2x}\,J$, where x is in meters. What is the value of x where $F(x)$ is equal to zero?

(A) -1.0 m (B) 1.0 m (C) 0.5 m (D) -0.5 m (E) 0 m

2. The potential energy function of a particle moving in one dimension is $U = kx^2e^{-x^2/a^2}$ where a = 7.50 nm. At what value of x is a point of stable equilibrium located?

(A) 6.81 nm (B) 7.50 nm (C) 7.80 nm (D) 11.03 nm (E) 12.62 nm

(93後西醫)

出自於第三次模擬考考題，相似度80%

44. Two stars are separated by an angle of 3×10^{-5} radians. What is the diameter of the smallest telescope that can resolve the two stars using visible light ($\lambda \cong 600$ nm)? (Ignore any effects due to Earth's atmosphere.)

(A) 1 mm (B) 2.5 cm (C) 10 cm (D) 2.5 m (E) 10 m

22. A pinhole camera has a hole of diameter 1 mm. The film is placed 10 cm from the hole. Consider two point objects located 10 m from the hole. Assuming the light has a wavelength of 500nm, what is the minimum separation between the source objects for them to be resolved?

(A) 32 cm; (B) 0.32 mm; (C) 6.1 cm; (D) 6.1 mm; (E) 6.1 m.

出自於程量子平時作業，相似度95%

45. Unpolarized light of intensity I_0 is incident on a series of three polarizing filters. The axis of the second filter is oriented at 45° to that of the first filter, while the axis of the third filter is oriented at 90° to that of the first filter. What is the intensity of the light transmitted through the third filter?

(A) 0 (B) $\frac{I_0}{8}$ (C) $\frac{I_0}{4}$ (D) $\frac{I_0}{2}$ (E) $\frac{I_0}{\sqrt{2}}$

11. A system of three polarizing sheets lies in the path of initially unpolarized light, which is in the z direction. The polarizing direction of the first sheet is parallel to the y axis, that of the second sheet is at an angle of 45° from the y axis, and that of third sheets is parallel to the x axis. What fraction of the initial intensity of the light emerges from the three-sheet system?

(A) 1/2 (B) 1/4 (C) 1/8 (D) 1/16 (E) none of the above.