

科目：普通物理 適用：土木系二、應化系二、電機系二、應光系二

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

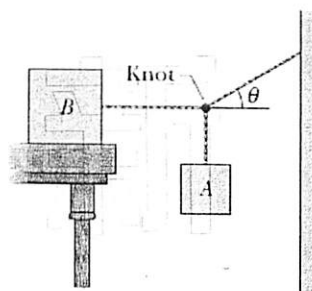
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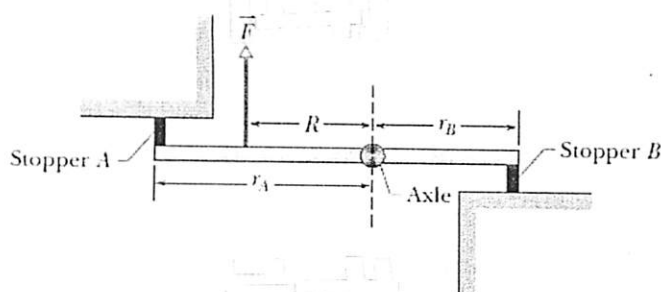
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編號：422、432、442、452

1. Block B in figure below weighs 711 N. The coefficient of static friction between block and table is 0.25; angle  $\theta$  is  $30^\circ$ ; assume that the cord between B and the knot is horizontal. Find the maximum weight of block A for which the system will be stationary. (25%)  
(Hint:  $\cos 30^\circ = 0.866$ )



2. Figure below is an overhead view of a rigid rod that turns about a vertical axle until the identical rubber stoppers A and B are forced against rigid walls at distances  $r_A = 7.0$  cm and  $r_B = 4.0$  cm from the axle. Initially the stoppers touch the walls without being compressed. Then force  $\vec{F}$  of magnitude 220 N is applied perpendicular to the rod at a distance  $R = 5.0$  cm from the axle. Find the magnitude of the force compressing (a) stopper A (15%) and (b) stopper B. (10%)



3. The equation of a transverse wave on a string is

$$y = (2.0\text{mm})\sin[(20\text{m}^{-1})x - (600\text{s}^{-1})t]$$

The tension in the string is 15 N. (a) What is the wave speed? (10%) (b) Find the linear density of this string in grams per meter. (15%)

4. In figure below, the battery has a potential difference of  $V = 10.0$  V and the five capacitors each have a capacitance of  $10.0 \mu\text{F}$ . What is the charge on (a) capacitor 1 (10%) and (b) capacitor 2? (15%)

