

科目：普通物理

適用：土木系二

編號：332

考生注意：

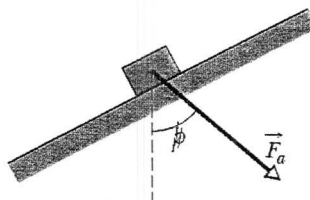
1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本 試 題

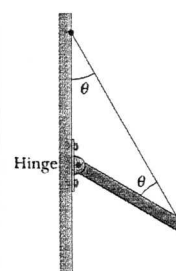
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1. In the right figure, a constant force \vec{F}_a of magnitude 82.0 N is applied to a 3.00 kg shoe box at angle $\phi=53.0^\circ$, causing the box to move up a frictionless ramp at constant speed. How much work is done on the box by \vec{F}_a when the box has moved through vertical distance $h=0.20$ m? (25%)

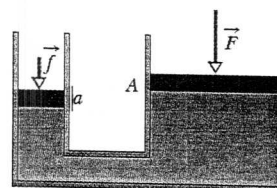


2. In figure, one end of a uniform beam of weight 100 N is hinged to a wall; the other end is supported by a wire that makes angles $\theta=30.0^\circ$ with both wall and beam. Find (a) the tension in the wire and the (b) horizontal and (c) vertical components of the force of the hinge on the beam. (8%+8%+9%)

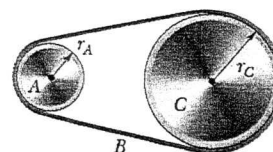


Hint: $\frac{\sin 60^\circ}{\sin 30^\circ} = 1.732$

3. A piston of cross-sectional area a is used in a hydraulic press to exert a small force of magnitude f on the enclosed liquid. A connecting pipe leads to a larger piston of cross-sectional area A . If the piston diameters are 3.80 cm and 53.0 cm, what force magnitude on the small piston will balance a 15.0 kN force on the large piston? (25%)



4. In figure, wheel A of radius $r_A=10$ cm is coupled by belt B to wheel C of radius $r_C=25$ cm. The angular speed of wheel A is increased from rest at a constant rate of 1.6 rad/s^2 . Find the time needed for wheel C to reach an angular speed of 90 rev/min, assuming the belt does not slip. (Hint: If the belt does not slip, the linear speeds at the two rims must be equal.) (25%)



Note: All equations must be listed.