

Problems of the Week 9

Always show your work to receive credit (NO WORK=NO CREDIT)

1. A hollow steel sphere and a steel block of equal mass are placed on an inclined plane of angle θ . The coefficients of static and kinetic friction are 0.30 and 0.25, respectively. They are released from rest. Find the value of θ that produces the same acceleration for each object (the ball is rolling without slipping).
A. 16.6° B. 25.2° C. 32.0° D. 41.2° E. 46.0°

2. A 1.0kg spool of radius $a=0.39\text{m}$ is pulled on a horizontal surface about axle of radius $b=0.13\text{m}$. Assume, the moment of inertia of the spool is $\frac{1}{2}Ma^2$ and the coefficient of friction between the surface and the spool is 0.3. What is the maximum value of the force F that can be applied to the string such that the spool rolls without slipping? **Hint: You need to demonstrate this motion with a spool of thread before attempting to solve the problem.**
A. 2.4N B. 3.8N C. 5.3N D. 6.6N

