

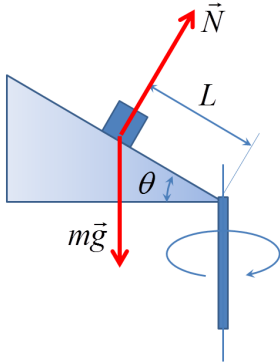
Physics 2314, Homework #4 (due 2/21)

Multiple choice questions

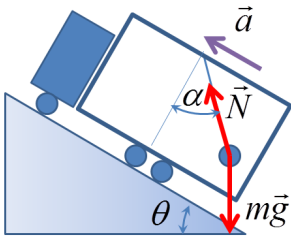
- M1 For an object moving along the radius with a constant velocity in a rotating reference frame, Coriolis force is
- A. parallel to centrifugal force.
 - B. perpendicular to centrifugal force.
 - C. zero.
- M2 Assume that the resistive force acting on an object is proportional to its velocity. The object is released at time $t = 0$ with zero initial velocity. After $t = 1$ s, the object reaches one half of the terminal speed v_T . What will be the speed of the object after $t = 2$ s?
- A. $0.25 v_T$
 - B. $0.5 v_T$
 - C. $0.75 v_T$
 - D. $\left(1 - \frac{1}{e}\right) v_T$
 - E. $\left(1 - \frac{2}{e}\right) v_T$
 - F. v_T

Problems

- P1 A wedge with acute angle $\theta = 30^\circ$ is spun by rotating a vertical rod that is firmly attached to the wedge at the bottom end. An object sits at rest at distance $L = 0.3$ m up along the wedge. Assuming there is no friction, what is the speed of the object?



- P2 A truck is moving with constant acceleration a up a hill that makes an angle $\theta = 5^\circ$ with the horizontal. A pendulum suspended from the ceiling of the truck makes a constant angle $\alpha = 15^\circ$ with the perpendicular to the ceiling. What is the truck acceleration a ?



- P3 A conical pendulum consists of a ball of mass 0.5 kg suspended from a string of length 0.4 m. The ball revolves with constant speed 2.4 m/s. Find the tension of the string.
- P4 Find the terminal speed of a spherical object with radius 0.2 m and density 1.5×10^3 kg/m³. Assume air density $\rho = 1.225$ kg/m³ and drag coefficient $D = 0.47$.