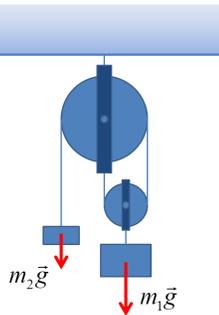


Physics 2314, Homework #3 (due 2/7)

Multiple choice questions

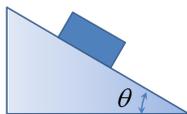
M1 A system of frictionless pulleys is at equilibrium (the acceleration of each of the blocks m_1 and m_2 is zero). What is the ratio of masses m_1/m_2 ?

- A. $1/3$
- B. $1/2$
- C. 1
- D. 2
- E. 3



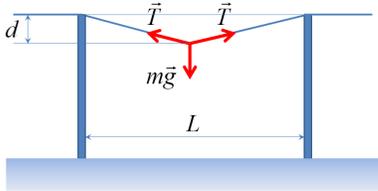
M2 A block is carefully placed on an incline with angle θ so that it is initially at rest. The coefficients of friction are $\mu_s = 0.45$ and $\mu_k = 0.40$. Mark all values of θ for which the block will begin to move down after being released.

- A. 22.5°
- B. 30°
- C. 45°

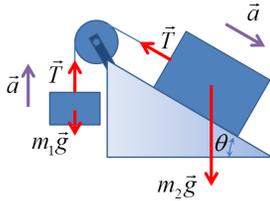


Problems

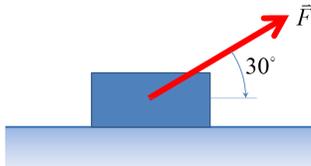
- P1 The distance between two telephone poles is $L = 40$ m. When a 1 kg bird lands on the telephone wire midway between the poles, the wire sags $d = 0.2$ m. How much tension does the bird produce in the wire? Ignore the weight of the wire.



- P2 Two objects of masses $m_1 = 1$ kg and $m_2 = 5$ kg are connected by a light string that passes over a frictionless pulley. The objects are moving with acceleration $a = 2.45$ m/s² with the mass on the incline moving down. (a) If the incline is frictionless, what is the angle θ of the incline? (b) If the angle $\theta = 45^\circ$, what is the coefficient of kinematic friction between the object 2 and the incline?



- P3 An object of mass 5 kg is being dragged by a force \mathbf{F} directed at an angle $\theta = 30^\circ$ above the horizontal with a constant velocity. Find the coefficient of kinetic friction.



- P4 Two forces $\mathbf{F}_1 = (2\mathbf{i})$ N and $\mathbf{F}_2 = (2\mathbf{i} + 3\mathbf{j})$ N act on an object of mass 2 kg. Find the magnitude and the direction of the acceleration of the object.

