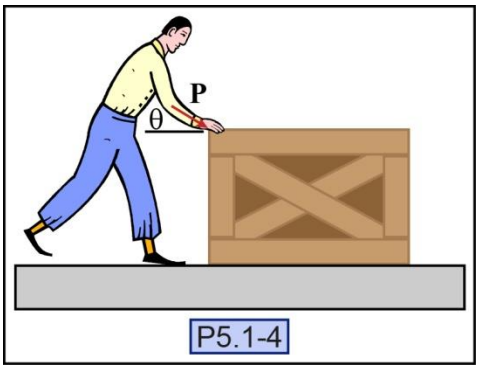
P5.1-4) A man pushes a 100-lb wooden crate along a concrete floor. What is the acceleration of the crate if he applies a force of P = 100 lb at an angle of θ = 20º? Assume that the kinetic coefficient of friction is 80% that of the static coefficient of friction which may be found in Appendix C.



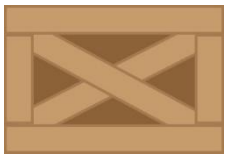
P5.1-4

Given:

Find:

Solution:

Free-body diagram



Check if the crate will slide.

Write down the crate's equation of equilibrium, in variable form, in the direction of intended motion.

Eq.E: _____

Solve for the static friction force.

F_{fs} = _____

Calculate the maximum static friction force.

$F_{fs,max}$ = _____

Will the crate slide?

Yes No

Why? _____

Equation of Motion

Derive the crate's equation of motion, in variable form.

Eq.M: _____

Calculate the kinetic friction.

F_{fk} = _____

Calculate the crate's acceleration

a = 8.81 ft/s^2