Sample test

Form B

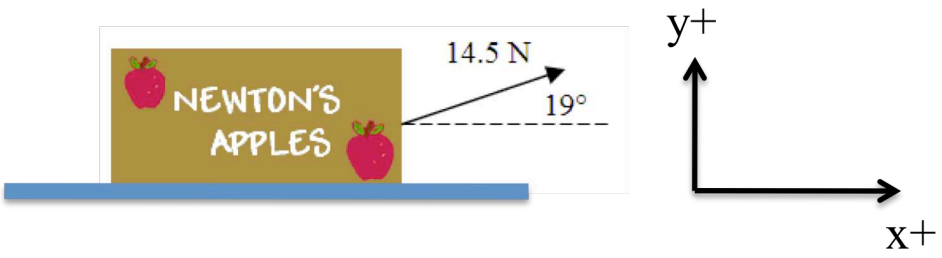
NAME:
ID:

SHOW YOUR WORK AND JUSTIFY YOUR ANSWERS.
Phones, notes, books are not allowed during the exam.

This is a sample test. The questions in the exam will be similar to these, but the problems will be different. For practice, do the problems in the book (Ch. 4,5,6).

1- An apple crate with a mass of 20 kg stands on a frictionless horizontal surface. A force F = 14.5 N is applied to the crate, forming an angle of 19° with the horizontal.

a) Do the Free Body Diagram (FBD) of the crate, indicating all the forces applied to it.



b) Find the x and y components of the force F and write the Newton's equations in x and y directions.
c) Find the normal force.
d) Find the acceleration of the crate.

2- A 68-kg gymnast is swinging on a high bar. The distance between his waist and the bar is 1.0 m, as the drawing shows. At the top of the swing his speed is momentarily zero. Ignore friction and treat the gymnast as if all his mass is located at his waist

a) Using the work-energy theorem find his speed at the bottom of the swing.
b) Find the centripetal acceleration of the gymnast at the top and at the bottom of the swing.
c) If friction were not negligible, his kinetic energy at the bottom would be reduced by 10%. How much would the work of friction be, while the gymnast moves from the top to the bottom of the swing?