This print-out should have 9 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

**Hanging Weight 06**

**001 (part 1 of 2) 10.0 points**
Consider the 614 N weight held by two cables shown below. The left-hand cable had tension $T_2$ and makes an angle of 36° with the ceiling. The right-hand cable had tension $T_1$ and makes an angle of 50° with the ceiling.

![Diagram of tension cables]

a) What is the tension in the cable labeled $T_1$ slanted at an angle of 50°?

Correct answer: 497.949 N.

**002 (part 2 of 2) 10.0 points**
a) What is the tension in the cable labeled $T_2$ slanted at an angle of 36°?

Correct answer: 395.635 N.

**Static Equilibrium 05**

**003 (part 1 of 2) 10.0 points**
The knot at the junction is in equilibrium under the influence of four forces acting on it. The $F$ force acts from above on the left at an angle of $\alpha$ with the horizontal. The 5.6 N force acts from above on the right at an angle of 45° with the horizontal. The 5.9 N force acts from below on the right at an angle of 51° with the horizontal. The 5.5 N force acts from below on the left at an angle of 39° with the horizontal.

![Diagram of forces]

Note: $F, \alpha$ are not to scale.
What is the magnitude of the force $F$?

Correct answer: 5.31509 N.

**004 (part 2 of 2) 10.0 points**
What is the angle $\alpha$ of the force $F$ as shown in the figure above?

Correct answer: 50.2527°.

**Accelerated System 01**

**005 (part 1 of 2) 10.0 points**
A block of mass 7.26 kg lies on a frictionless horizontal surface. The block is connected by a cord passing over a pulley to another block of mass 4.61 kg which hangs in the air, as shown. Assume the cord to be light (massless and weightless) and unstretchable and the pulley to have no friction and no rotational inertia.

![Diagram of accelerated system]

Calculate the acceleration of the first block.
The acceleration of gravity is 9.8 m/s².

Correct answer: 3.80607 m/s².

**006 (part 2 of 2) 10.0 points**
Calculate the tension in the cord.

Correct answer: 27.632 N.
Pulling Two Blocks 02

Two blocks connected by a string are pulled across a rough horizontal surface by a force applied to one of the blocks, as shown. The acceleration of gravity is \( 9.8 \text{ m/s}^2 \).

If each block has an acceleration of \( 0.9 \text{ m/s}^2 \) to the right, what is the magnitude of the applied force?

Correct answer: 28.2158 N.

Sliding Down a Ramp

A box slides down a \( 29.9^\circ \) ramp with an acceleration of \( 1.29 \text{ m/s}^2 \). The acceleration of gravity is \( 9.8 \text{ m/s}^2 \). Determine the coefficient of kinetic friction between the box and the ramp.

Correct answer: 0.423182.

Acceleration with Friction 01

There is friction between the block and the table. The suspended 2 kg mass on the left is moving up, the 3 kg mass slides to the right on the table, and the suspended mass 4 kg on the right is moving down. The acceleration of gravity is \( 9.8 \text{ m/s}^2 \).

What is the magnitude of the acceleration of the system?

Correct answer: 1.62244 m/s\(^2\).