SAXONY EGYPT
UNIVERSITY
FOR APPLIED SCIENCE
AND TECHNOLOGY

GAP121 Physics I

Academic Year: 24/25
Semester: Spring 2025

Assignment

1. A spring has a spring constant k of 82.0 N/m. How much must this spring be compressed to store 35.0 J of potential energy?

2. A stone is thrown straight upward with an initial velocity of 20.0 m/s. Find the maximum height the stone can reach by applying the principle of conservation of mechanical energy.

3. Assuming the height of the hill y_1 shown in Figure is 40 m, and the roller-coaster car starts from rest at the top, calculate:

   a) the speed of the roller-coaster car at the bottom of the hill

   b) At what height it will have half this speed. Take y = 0 at the bottom of the hill.

   c) Work done by the gravitational force from position 1 to position 2

4. The launching mechanism of a toy gun consists of a spring of unknown spring constant. When the spring is compressed 0.120 m, the gun, when fired vertically, is able to launch a 35.0-g projectile to a maximum height of 20.0 m above the position of the projectile before firing. Find the spring constant.