LES10A020 Engineering Physics / Home Assignment 6

Please submit the answers to the assignment task into the corresponding submission question locations on Moodle (to be available before deadline). Please calculate your results carefully, as the results for this assignment will be submitted only as numeric values.

This assignment is due October 26th, at 23:59. Each task lists how many points it is worth.

The book referred into in the assignment is the "College Physics" by Urone and Hinrichs available here.

Task 1. Car with a mass of 800 kg, drives in circles with speed 50 km/h. The time for one round is 24 seconds. **A)** What is the circle radius? **B)** What is the angular velocity of the car **[2p]**

Task 2. Twin jet engines on an airplane are producing an average sound frequency of 4100 Hz with a beat frequency of 0.500 Hz. What are their individual frequencies? **[2p]**

Task 3. A mass of 11 kg is connected to a spring with a spring constant $k = 43\ \mathrm{N/m}$. **A)** If the maximum velocity of the mass is 10 m/s and no friction forces are considered, what is the amplitude the mass is vibrating? **B)** How much the mass is displaced from the equillibrium, when it has as much potential and kinetic energy?

Task 4. A) How much will a spring that has a force constant of 40.0 N/m be stretched by an object with a mass of 0.500 kg when hung motionless from the spring? **B)** Calculate the decrease in gravitational potential energy of the 0.500-kg object when it descends this distance. **C)** Part of this gravitational energy goes into the spring. Calculate the energy stored in the spring by this stretch and compare it with the gravitational potential energy. **[2p]**

Task 5. A mass of 11 kg is connected to a spring with a spring constant $k = 43\ \mathrm{N/m}$. Assume the mass is sliding on a surface with unknown friction. When the mass begins its movement with exactly 2.0 m displacement, it slides a total distance of 4.0 m. What would be the final displacement of the mass be at the end of its movement? (Hint: follow book example 16.7 to get started. You need to solve the friction from a second order equation to reach the end result) **[2p]**