

Physics 121 – October 24, 2017

Announcements:

Chap 9 HW due by 4 pm today.

Assignments:

This week:

- Read Chapter 10.
- Complete ETA Problem Set #10 by Monday, Oct 30.
- End-of-chapter problems: Chap 10 #35, 41, 54, 62, 67, and 68. Due by 4 pm, Oct 30.
- Recitation: Practice problems on springs, Chap 9, and on free body diagrams.

Topics for today:

- Examples from ETA involving impulse and momentum
- Start on Chap 10

Clicker question

A spring is resting vertically and has a spring constant of $k=2,000 \text{ N/m}$. A weight of $2,000 \text{ N}$ is used to compress the spring. How far is the spring compressed from equilibrium?

- A. 1 cm
- B. 10 cm
- C. 1 m
- D. 10 m

Clicker question

A spring is resting vertically and has a spring constant of $k=2,000$ N/m. A weight of $2,000$ N is used to compress the spring. What is the elastic potential energy stored in the spring?

- A. 1 J
- B. 10 J
- C. 100 J
- D. 1000 J

ETA Problem 9.4.22

Professional Application *The Moon's craters are remnants of meteorite collisions. Suppose a fairly large asteroid that has a mass of 5.00×10^{12} kg (about a kilometer across) strikes the Moon at a speed of 15.0 km/s. (a) At what speed does the Moon recoil after the perfectly inelastic collision (the mass of the Moon is 7.36×10^{22} kg) ? (b) How much kinetic energy is lost in the collision? Such an event may have been observed by medieval English monks who reported observing a red glow and subsequent haze about the Moon. (c) In October 2009, NASA crashed a rocket into the Moon, and analyzed the plume produced by the impact. (Significant amounts of water were detected.) Answer part (a) and (b) for this real-life experiment. The mass of the rocket was 2000 kg and its speed upon impact was 9000 km/h. How does the plume produced alter these results?*