

C7 Potential Energy

C7.2: The Electromagnetic Interaction

Don't worry much about this section.

C7.3: The Gravitational Interaction

The main equation:

$$V(r) = -G \frac{m_1 m_2}{r} . \quad (1)$$

What do the symbols stand for?

Under what circumstances does this equation apply?

C7.4: Gravitation Near the Earth

The punchline of this chapter is Figure C7.3 on p. 94. This figure shows us that:

C7.5: The Spring Interaction

The main equation:

$$V(r) = \frac{1}{2} k_s (r - r_0)^2 . \quad (2)$$

What do the symbols stand for?

Under what circumstances does the equation apply?

Practice

1. A 50 kg diver jumps into the sea 40 meters below. The water into which she jumps is 20 meters deep. Determine her speed immediately before she hits the water. Do this problem two ways:
 - (a) Use the surface of the water as your reference level.
 - (b) Use the bottom of the sea as your reference level.
2. A spring with a spring constant of 300 J/m^2 is compressed 3 cm. This is then used to shoot a 30 g marble straight up into the air.
 - (a) What is the marble's speed immediately after the spring is released and before it begins its upward trajectory.
 - (b) How high will the marble go?
 - (c) What is the marble's speed when it's at half of its maximum height?
3. You would like to get a spring that is springey enough to launch your friend 2 meters into the air. What strength spring should you buy?