WebAssign
CH06-HW01-SP12 (Homework)

Yinglai Wang
PHYS 172-SPRING 2012, Spring 2012
Instructor: Virendra Saxena

Current Score : 20 / 20 **Due :** Thursday, February 16 2012 11:59 PM EST

---

1. 4/4 points | Previous Answers MI3 6.2.X.001

An electron has mass 9.11e-31 kg. If the electron's speed $|\vec{v}|$ is 0.948*c* (that is, $|\vec{v}|/c$ = 0.948), what are the following values?

particle energy = 2.58e-13 ✓ J

rest energy = 8.20e-14 ✓ J

kinetic energy = 1.76e-13 ✓ J

- *Read the eBook*
- Section 6.2

---

2. 2/2 points | Previous Answers MI3 6.2.X.042

A runner whose mass is 64 kg runs in the +x direction at a speed of 6 m/s. What is the kinetic energy of the runner?

K = 1152 ✓ J

The runner turns around and runs in the -x direction at the same speed. Now what is the kinetic energy of the runner?

K = 1152 ✓ J

- *Read the eBook*
- Section 6.2

---

3. 1/1 points | Previous Answers MI3 6.2.X.043

A baseball of mass 145 g is thrown with a velocity of < 23, 16, -11 > m/s. What is the kinetic energy of the baseball?

- 65700 J
- < 3.3, 2.3, -1.6 > J
- 65.7 J
- < 38.4, 18.6, 8.8 > J
- 4.4 J

- *Read the eBook*
- Section 6.2

---

4. 1/1 points | Previous Answers MI3 6.2.X.044

One mole of helium atoms has a mass of 4 grams. If a helium atom in a balloon has a kinetic energy of 1.224e-21 J, what is the speed of the helium atom? (The speed is much lower than the speed of light.)

v = 607 m/s

- *Read the eBook*
- Section 6.2

---

5. 1/1 points | Previous Answers MI3 6.2.X.045

You throw a ball of mass 175 g upward. When the ball is 2 m above the ground, headed upward (the initial state), its speed is 19 m/s. Later, when the ball is again 2 m above the ground, this time headed downward (the final state), its speed is 19 m/s.

What is the change in the kinetic energy of the ball from initial to final state?

ΔK = 0 *J*

- *Read the eBook*
- Section 6.2

---

6. 4/4 points | Previous Answers MI3 6.2.X.040

The point of this question is to compare rest energy and kinetic energy at low speeds.

A baseball is moving at a speed of 31 m/s. Its mass is 145 grams (0.145 kg).

(a) What is its rest energy? 1.305e16 ✓ J

(b) Is it okay to calculate its kinetic energy using the formula $\frac{1}{2}mv^2$?

- ○ Yes, because the formula $\frac{1}{2}mv^2$ for kinetic energy is always correct.
- ○ No, because you always have to use the formula $\gamma mc^2 - mc^2$.
- ◉ Yes, because $v << c$. ✓

(c) What is its kinetic energy? 69.67 ✓ J

(d) Which is true?

- ○ The kinetic energy is approximately equal to the rest energy.
- ○ The kinetic energy is much bigger than the rest energy.
- ◉ The kinetic energy is much smaller than the rest energy. ✓

- *Read the eBook*
- Section 6.2

---

7. 4/4 points | Previous Answers MI3 6.2.X.041

The point of this question is to compare rest energy and kinetic energy at high speeds.

An alpha particle (a helium nucleus) is moving at a speed of 0.9987 times the speed of light. Its mass is $(6.40 \times 10^{-27}$ kg).

(a) What is its rest energy? 5.76e-10 ✓ J

(b) Is it okay to calculate its kinetic energy using the formula $\frac{1}{2}mv^2$?

- ○ Yes, because the formula $\frac{1}{2}mv^2$ for kinetic energy is always correct.
- ○ Yes, because $v << c$.
- ◉ No, because this formula isn't valid for speeds near the speed of light. ✓

(c) What is its kinetic energy? 1.07e-8 ✓ J

(d) Which is true?

- ○ The kinetic energy is much smaller than the rest energy.
- ◉ The kinetic energy is much bigger than the rest energy.
- ○ The kinetic energy is approximately equal to the rest energy. ✓

- *Read the eBook*
- Section 6.2

---

8. 3/3 points | Previous Answers MI3 6.2.X.046

A fancart of mass 0.8 kg initially has a velocity of < 0.7, 0, 0 > m/s. Then the fan is turned on, and the air exerts a constant force of < -0.3, 0, 0 > N on the cart for 1.5 seconds.

What is the change in momentum of the fancart over this 1.5 second interval?

$\Delta\vec{p}$ = < -0.45 ✓ , 0, 0 > kg· m/s

What is the change in kinetic energy of the fancart over this 1.5 second interval?

ΔK = -0.1884 ✓ J

- *Read the eBook*
- Section 6.2