

The Many Forms Of Energy (p. 285 - 292)

I. A Model Of The Work-Energy Theorem

1. Energy can be transformed from one form to another.

Circle One : True False

Similar to money:
(Cash, Checking, Savings, Traveler's Checks, Gold)



2. What happens in each situation with regards to energy?

Work is done on a system : Energy of the system increases

Work is done by a system : Energy of the system decreases (-) - cooling



Baseball Example
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3. What is the kinetic energy of an object after being thrown or caught?

$$KE_{after} = KE_{before} + W$$

Thrown: $W > 0$
Caught: $W < 0$

II. Kinetic Energy

1. Write the formula used to determine kinetic energy. (Review question)

$$KE = \frac{1}{2} mv^2$$

2. Kinetic energy is proportional to an object's velocity and proportional to the square of the object's mass.

Circle One : True False

3. Define the term rotational kinetic energy.

Rotational Kinetic Energy - kinetic energy of an object proportional to the moment of inertia and proportional to the square of angular velocity

4. Write the formula used to determine rotational kinetic energy.

$$KE_{rot} = \frac{1}{2} I \omega^2$$

$I = \text{moment of inertia} = mr^2$
 $\omega = \text{angular velocity} = \frac{\Delta \theta}{\Delta t}$

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5. List three examples of objects possessing linear and rotational kinetic energy.

1. Diver 2. Baseball 3. Frisbee

III. Stored Energy

1. Define the term potential (stored) energy.

Potential Energy - stored energy due to position or shape

2. How is money similar to different forms of energy?

Regardless of its form, money is money (Like energy)
(Cash, Checking, Savings, Traveler's Checks)

3. List the three different forms of potential (stored) energy.

1. Gravitational 2. Elastic 3. Chemical

Food, Gasoline, Matches 1 cal. = 4.18 J

IV. Gravitational Potential Energy

1. Which type of gravitational work is performed on an object moving upward in the air?

Circle One :

$W_g = mgh$

$W_g = -mgh$

$g = -9.8 \text{ m/s}^2$

2. What happens to the kinetic energy of an object as it moves up and down in the air?

- As the object moves up it loses KE (and velocity) and as it falls it regains KE (and velocity)
 ↳ (KE transformed into PE)

3. Define the term gravitational potential energy.

Gravitational Potential Energy - energy stored in objects due to their position above the surface

4. Write the formula used to determine gravitational potential energy.

$PE = mgh$

5. List three examples of gravitational potential energy.

1. Diver 2. Parked car on hill 3. Penny on skyscraper

6. Define the term reference level.

Reference Level - position where PE is defined to be zero (used to measure height)

7. What units are used to measure potential energy? Joules

V. Elastic Potential Energy

1. Define the term elastic potential energy.

Elastic Potential Energy - energy stored in something that can stretch or compress

2. List three examples of elastic potential energy.

1. Guitar String 2. Rubber Band 3. Springs
 (4.) Basketball

3. Define the term rest energy.

Rest Energy - potential energy of an object equal to mass times the speed of light squared

4. Write the formula used to determine rest energy.

$E_0 = mc^2 = (\text{mass})(\text{speed of light})^2$

$c = 300,000 \text{ meters/sec.}$

5. A small amount of change in matter can produce large amounts of energy.

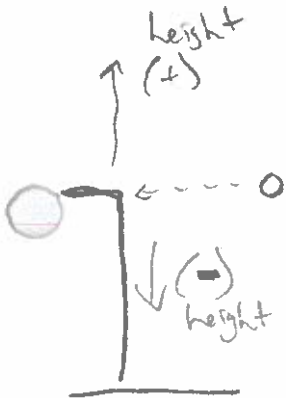
Circle One :

True

False

- Energy is released as matter is destroyed.
 - Matter can be created from energy

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Nuclear Forces + Mass Changes