



STEPPING STONE
SCHOOL (HIGH)

STEPPING STONE SCHOOL(HIGH)

Class : 10

Sub : Physics

Chapter : Work ,Energy and Power (Part4)

Date : 01.06.2020

Day : 7

Worksheet : 7

Topic : Different forms of Energy

Please read the notes carefully and on the basis of it copy down the questions and solve them on a clean sheet of paper arranged data wise and keep the worksheet ready in a file to be submitted on the opening day.

Mechanical Energy

The energy possessed by a body due to its state of rest or of motion.

Two forms of mechanical energy are:

1.**Potential Energy**- The energy possessed by a body at rest due to its position or size and shape.

2.**Kinetic Energy**- The energy possessed by a body due to its state of motion.

Forms of Potential Energy

1. **Gravitational Potential Energy**– The Potential Energy possessed by a body due to the force of attraction of Earth on it.

2. **Elastic Potential Energy**– The Potential Energy possessed by a body in the deformed state due to change in its size and shape.

Forms of Kinetic Energy

1. **The Translational Kinetic Energy**– The motion of a body in a straight line path.

2. **Rotational Kinetic Energy**– If a body rotates about an axis.

3. **Vibrational Kinetic Energy**– If a body moves to and fro about its mean position.

Expression for Potential Energy and Kinetic Energy

Potential Energy = mgh

Kinetic Energy = $\frac{1}{2} mv^2$

Where m is mass of body

g is acceleration due to gravity

h is the height

v is the velocity.

Relation between K.E and momentum

$$K. E = \frac{1}{2}mv^2$$

$$\text{Momentum } p = mv$$

$$\text{Therefore, } K.E = \frac{1}{2} mv^2$$

$$= \frac{1}{2} \times m^2 v^2 / m$$

$$= \frac{1}{2} \times (mv)^2 / m$$

$$= \frac{1}{2} \times p^2 / m$$

$$= p^2 / 2m$$

Work Energy Theorem

The increase in kinetic energy of a moving body is equal to the work done by a force acting in the direction of the moving body.

Proof: Force $F = m \times a$

Work done $W = F \times S$

From relation $v^2 = u^2 + 2aS$

$$S = (v^2 - u^2) / 2a$$

Therefore $W = m \times a \times (v^2 - u^2) / 2a$

$$= \frac{1}{2} * m (v^2 - u^2)$$

So, $W = \frac{1}{2} mv^2 - \frac{1}{2} mu^2$

Workdone = Increase in Kinetic energy.

Answer the following questions.

1. Name the form of energy which a wound up watch spring possesses.

2. State the work energy theorem and prove it.

3. A body of mass 'm' is moving with a uniform velocity 'u'. A force is applied on the body due to which velocity increases from u to v.

How much work is done by the force?

4. A light mass and a heavy mass have equal momentum. Which will have more kinetic energy?

5. Two bodies A and B of masses m and M ($M \gg m$) have same kinetic energy. Which body will have more momentum?
6. Name the three forms of kinetic energy and give one example of each.
7. State two differences between potential energy and kinetic energy.
8. A ball is placed on a compressed spring. What form of energy does the spring possess?
9. Name the form of energy in which potential energy can change.
10. Two bodies of equal masses are placed at heights h and $2h$. Find the ratio of their gravitational potential energies.

Please click on the hyperlink below to see the video content.

https://youtu.be/zv_QRhz2lhw