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ENERGY

CHAPTER NO.-3

SUB: PHYSICS

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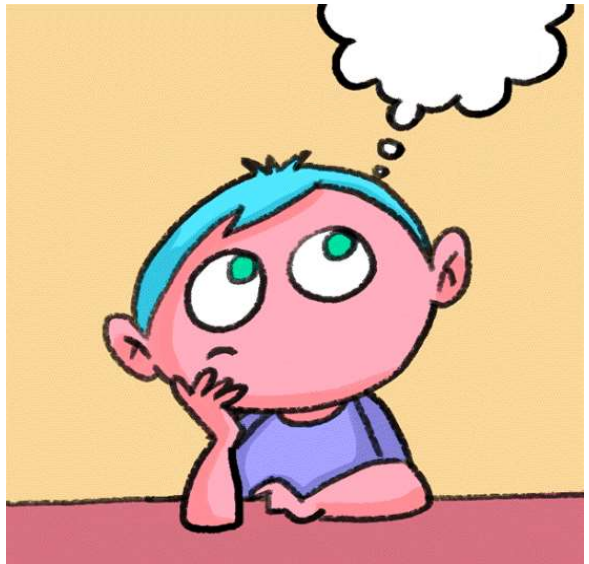
LEARNING OBJECTIVE

Students will be able

- ✓ Define energy
- ✓ Define kinetic and potential energy



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TWO FORMS OF MECHANICAL ENERGY

Mechanical energy has two forms

- Potential energy
- Kinetic energy

Potential Energy:

It is the energy possessed by an object due to its position or change in its shape.

Force acting on a body or system can change its Potential Energy.

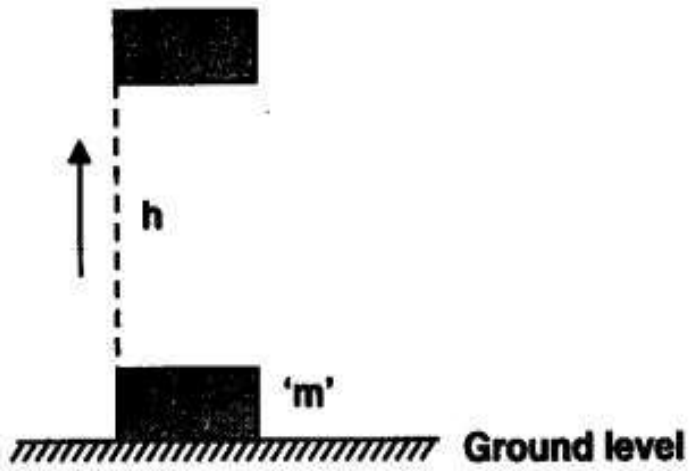
Potential energy is denoted by letter U.

All bodies fall towards the earth with a constant acceleration known as acceleration due to gravity.

Expression for Potential Energy

The potential energy (E_p) is equal to the work done over an object of mass ‘m’ to raise it by a height ‘h’.

Thus, $E_p = mgh$, where g = acceleration due to gravity



For example:

- In bow the stretched band can do work as when the stretched band is released the arrow starts moving so we can say that stretched band has energy.

In this case, energy possessed by the stretched band is due to change in shape.

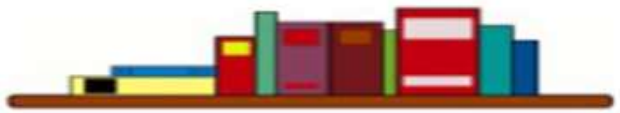
- The block on ground can’t do work. The block at high position can do work so it has energy.

In this case, energy possessed by the block is due to its position.

Three types of potential energy:

Gravitational

Energy potential that comes from and object's height and weight



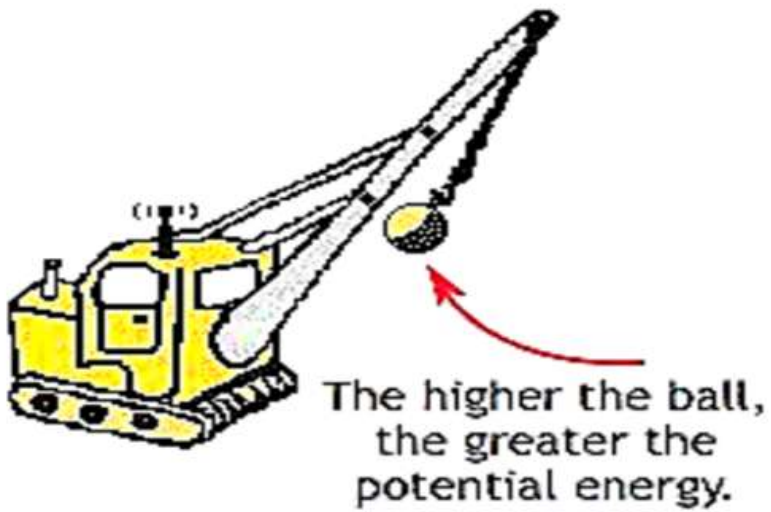
Chemical

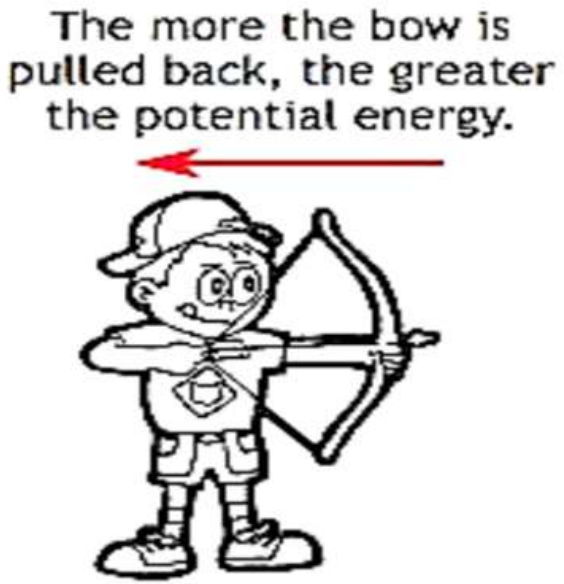
Energy potential comes from the atoms it contains and the chemical reactions that take place within the object

Elastic

Energy potential an object being compressed or stretched

Gravitational Potential Energy: It is the energy possessed by a body due to its position above the ground.
If an object is at greater height, it has more potential energy





Elastic Potential Energy: It is the energy possessed by a body due to its change in shape.

Potential Energy (P.E.) = mgh

Here,

m = mass of body

g= 9.8 m/s2

h= height of object from ground

Factors affecting the potential energy placed at a height

The potential energy of a body in the raised position depends up on following two factors

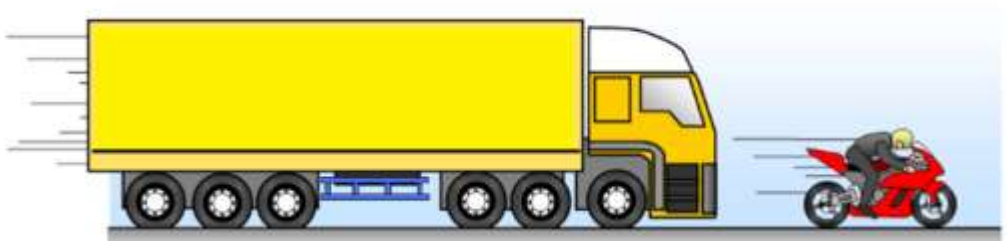
The mass of the body: greater the mass of the body, greater is the potential energy of the body

Its height above the ground: Higher the height of the body, greater is its potential energy

Kinetic Energy:

- It is the energy possessed by an object due to its motion.
- Anything moving is said to have kinetic energy.
- Body moving with greater velocity would posses greater K.E in comparison of the body moving with slower velocity
- Kinetic energy of a body moving with a certain velocity is equal to the work done on it to make it acquire that velocity.

For example; here the bike is moving so it has kinetic energy



Kinetic energy (K.E.) = 1/2mv2

Here,

m = Mass of object;

v = Speed of object;

- If two objects have same velocity but different masses then object which have more mass possesses more kinetic energy.
- Similarly more speed means more kinetic energy and vice versa.

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HOME ASSIGNMENT

Text Book Exercise

Q NO.4,5,7,8

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