

Energy

1) What is called Work done?

Ans:- Work is said to be done if the force applied on a body moves it.

If no motion takes place, no work is said to be done.

For example - A cyclist pedalling a cycle does work.

* Work is also done by a force if the force applied on a body changes its size and shape.

For example - If anyone squeezes a toothpaste tube or gum tube or a rubber ball, he does work in changing the shape of the tube or ball.

2) When it is called that work does not done?

Ans - If there is no change in position or no motion even after applying force, then it called work does not done.

For example - When a person pushing against a wall also does no work since he is not able to move the wall.

3) Which of the conditions must be fulfilled when a work is done?

Ans:- Following two conditions must be fulfilled for work to be done-

a) A force must act on the body.

b) The force must produce change in position i.e. motion of the body or change in size or shape of the body.

4) Which of the following factors are affecting the amount of work done?

Ans:- The amount of work done by a force depends on the following two factors-

a) The magnitude of the force applied and

b) The distance moved by the body in the direction of force.

a) The magnitude of the force applied

Work done is more if the force applied to move the body is more.

Example - More work is done by us if we lift a bucket full of water from the ground floor to the 1st floor than if we lift an empty bucket to the same height. The reason is that we have to apply a greater force to lift the bucket full of water than to lift the empty bucket.

b) The distance moved by the body in the direction of force

Work done is more if the distance moved by the body in the direction of force is more.

Example - More work is done by us if we lift a bucket of water from the ground floor to the second floor than if we lift the same bucket from the ground floor to the first floor.

5) What is work done?

Ans:- The work done by a force on a body is equal to the product of the force applied and the distance moved by the body in the direction of force.

$$\text{Workdone} = \text{Applied force} \times \text{Distance moved in the direction of force}$$

6) What is the SI unit of workdone?

Ans:- The SI unit of workdone is Newton x metre (Nm); which is known as Joule (J). ~~(astore)~~

7) What is one Joule?

Ans:- One Joule is said to be done if one newton force when acting on a body moves it by 1 metre in the direction of force.

8) What is the relation of Kgf x m and Joule?

Ans:- we know $1 \text{ kgf} = 9.8 \text{ newton}$

$$\Rightarrow 1 \text{ kgf x m} = 9.8 \text{ newton x metre}$$

$$\Rightarrow 1 \text{ kgf x m} = 9.8 \text{ Joule}$$

9) What is Energy?

Ans:- Energy is the capacity of doing work.

10) What is the relation between work and energy?

Ans:- * The work and energy is directly proportional.

i.e To do more amount of work, we need to spend more energy.

Example:- when we increase the speed of bicycle we ~~as~~ spent more energy.

* Similarly, The work done on a body in changing its state is said to be the energy possessed by the body.

Example- If a body is moved from the ground to a height, work is done on the body against the force of gravity and the body at the ~~high~~ height is said to possess energy.

11) What is the unit of Energy?

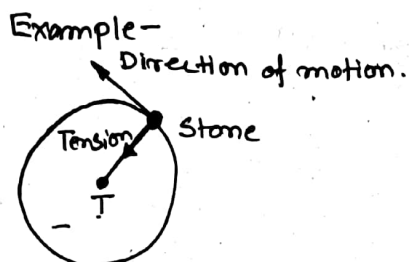
Ans:- The ^{SI} unit of Energy is Joule (J)

12) What is 1 Joule?

Ans:- A body is said to possess an energy of one Joule if it can do one Joule work or if one Joule work is done on it.

13) ~~What~~ When work done by a force is zero?

Ans:- The work done by a force is zero if the body moves in a direction perpendicular to the direction of force.



When a stone tied at the end of a string is whirled in a horizontal circular path, the motion of stone is ~~app~~ always normal to the force of tension in the string as shown in the figure.

Therefore, the work done by the force of tension on the string is zero.

14) What is Mechanical Energy?

Ans:- The energy possessed by a body due to its state of rest or state of motion is called Mechanical Energy.

15) What are different types of Mechanical Energy?

Ans:- Mechanical Energy are two forms -

a) Potential Energy.

b) Kinetic Energy.

16) What is Potential Energy?

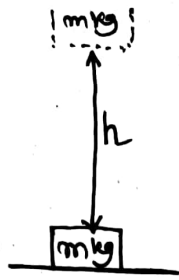
Ans:- The energy possessed by a body due to its state of rest or position is called Potential Energy.

This is the energy stored in the body when work has been done by a force in bringing the body to the state of rest or position.

17) What is called Gravitational Potential Energy?

Ans:- When a body ^{is} taken from the earth surface to a height, work has to be done on the body against the force of gravity on it. This work done is stored in the body in form of potential energy. This energy is called Gravitational Potential Energy.

18) What is the mathematical expression of Gravitational Potential Energy?



Let a body of mass m kg moved from the ground to a height of h m. The minimum upward force required to move the body ~~acting vertically~~ will be the force of gravity on the body acting vertically downward.

If the gravitational force ' g ' is on a mass of 1 kg, the force of gravity on mass ' m ' kg will be $= mg$ N

So, Force needed $= mg$ N

Distance $D = h$ m

So Work done $W = \text{Force} \times \text{Distance moved}$

$$\Rightarrow W = mgh$$

This work done against the force of gravity, is stored in the body at height ' h ' m in form of its gravitational potential energy.

So Gravitational Potential Energy

$$PU (U) = mgh$$

19) What is the SI unit of Potential Energy?

Ans: The SI unit of Potential Energy is Joule (J).

20) Which factors are affecting Potential Energy?

Ans: We know Potential energy

$$PU = mgh$$

where $m =$ Mass of the body

$h =$ ~~height~~ Height where the body is moved from the ground

$g =$ Gravitational Force acting on the body

Now 'g' is constant

So Potential Energy $P.E = mgh$

So, The potential Energy depends on the following two factors -

a) Mass of the body

Potential Energy is directly proportional with the mass of the body. So, greater mass of a body, greater is the potential energy.

b) It's height above the ground

Potential Energy is directly proportional to the height. So, higher the height of the body, greater the potential energy.

21) How many forms of Potential Energy?

Ans: Potential Energy is of two forms -

i) Elastic Potential Energy :- When the work done on the body changes its size or shape.

ii) Gravitational Potential Energy :- When the work is done to move a body to a height above the earth surface.

22) What is Kinetic Energy?

Ans: Kinetic Energy of a body is the energy possessed by it due to its state of motion.

23) Which factors are affecting the Kinetic Energy?

Ans: The Kinetic Energy of a moving body depends on the following two factors

i) The mass of the body :- Greater the mass of the body, higher is its kinetic energy.

ii) The speed of the body :- More the speed of the body, higher is its kinetic energy.

24) What is the mathematical expression of Kinetic energy.

Ans: If a body of mass 'm' is moving with a speed 'v', its kinetic ~~energy~~ energy is given as-

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

25) What is the SI unit of Kinetic Energy?

Ans: SI unit of Kinetic Energy is Joule (J)

26) What is the difference between Potential Energy and Kinetic Energy.

Potential Energy	Kinetic Energy
a) It is the energy possessed by a body due to its state of rest or position.	a) It is the energy possessed by a body due to its state of motion.
b) It is the work done on the body to bring it to that state of rest or position.	b) It is equal to the work done in moving the body initially from rest.
c) It can change only in form of Kinetic Energy.	c) It can change in any form of energy (Potential Energy, heat energy, light Energy)

27) What is the Law of Conservation of Mechanical Energy?

Ans: The potential energy changes into kinetic energy when it is put to use. In absence of friction, the sum of potential energy and kinetic energy remains constant at ~~each~~ each instant.

This is called the Law of Conservation of Mechanical Energy.