

Keywords

Energy: The ability of a body to do work

Potential energy: Energy possessed by a body by virtue of its position

Kinetic energy: Energy possessed by a body by virtue of its motion

Gravitational potential energy: Energy stored in an object on the earth because of its vertical position or energy height

Joule: When a force of one newton causes a displacement of one meter the work done is called to be one joule. Joule is the unit of work

Power: It is the rate of work done with respect to time or the rate of consumption of energy with respect to time

Chapter at a Glance

Work is said to be done when a force produces motion or in other words a body undergoes some displacement.

The standard unit of work is joule (J).

An object can do work which is equivalent to the energy it possesses. So, energy and work are analogous. The units of energy and work are also the same i.e. joule.

An object can acquire energy due to its position, and this energy is called potential energy. There are three main types of potential energy -

- Gravitational potential energy
- Elastic potential energy and
- Electric potential energy

Gravitational potential energy is the energy acquired by a body when it is raised at some height from the ground level. Energy is stored in an object due to gravitational force of the earth acting on the object.

The energy of a body due to a change in shape and size is called elastic potential energy. Elastic potential energy is associated with the state of compression or extension of an object.

According to the law of conservation of mass, energy can neither be created nor be destroyed. It can only be converted from one form to another.

Energy can change from one form to another, which results in the working of various devices.

The rate of doing work is known as power. It can also be defined as the rate of consumption of energy.

Energy**DPP - 1**

Tick the correct option.

1. An object lifted upwards, moves (against/along) the force of gravity.
2. Standard unit of kinetic energy is (newton/Joule).
3. A moving body possesses (potential energy/kinetic energy).
4. Microphones convert (sound energy/light energy) to electrical energy.

Fill in the blanks.

5. Work done in lifting a body is the product of the of the body and the vertical
6. Joule is the standard unit of
7. The sum total of energies of all kinds in an isolated system always remains
8. Power is related to rate at which is done.
9. The gravitational potential energy of an object is directly proportional to the above the ground.

Write T for true and F for false statement. Correct the false statement.

10. Work is considered to be done when an applied force changes the speed, shape or direction.
11. Kinetic energy is directly proportional to the square of the mass of the object.
12. All moving bodies have kinetic energy.
13. A compressed spring is associated with gravitational potential energy.

Name the following.

14. Two forms of mechanical energy.
15. Factors on which the kinetic energy of a body depends on.
16. Two examples of objects that possess gravitational potential energy.
17. Write SI unit (s) for the following.
 - a. Work
 - b. Energy
 - c. Power

Define the following.

1. Energy
2. Potential energy
3. Kinetic energy
4. Gravitational potential energy
5. Joule
6. Power

Differentiate the following.

7. Potential energy - Kinetic energy
8. Work - Energy
9. Gravitational potential energy - Elastic potential energy
10. Energy – Power

State the energy conversion that takes place in the following situations.

11. Photosynthesis
12. Bulbs and tube lights
13. Automobile engines, fans, motors
14. Microphones
15. Loudspeaker
16. Solar cell
17. Electromagnets
18. Charging of battery
19. Using a battery or a cell.
20. Ball falling from the top of a building

Give reason for the following.

21. Work done by the sun on planets moving around it in circular orbits is zero.
22. Kinetic energy is said to be a scalar quantity.
23. No work is done while reading a book.
24. Work done by a person white pushing a locked door is zero.
25. No work is done by a man carrying a suitcase strictly horizontally.

Energy **DPP - 3**

1. Complete the given table by giving examples from the daily Life for the following energy conversions.

Energy conversions	Example's
Chemical energy is converted into electrical energy	
Electrical energy is converted into sound energy	
Potential energy is converted into kinetic energy	
Kinetic energy is converted into potential energy	
Light energy is converted into chemical energy	

Answer the following.

2. When is work said to be done? When do we say that 1 joule of work is done?
3. List the three conditions for work to be done.
4. State the law of conservation of energy.
5. Explain how the total energy is conserved in the following situations:
 - a. Lifting a stone from the ground
 - b. When we kick a ball
 - c. When we rub our hands vigorously against each other

Solve the following numericals.

6. How high should an object of mass 15 kg be raised to acquires potential energy of 45 J?
7. A 50 kg battery run vehicle accelerates from 1.0 m/s to 2.0m/s in 2.0 s. How much power is required by the vehicle?
8. Calculate the power using the given data: $F = 460 \text{ N}$, $s = 14 \text{ m}$ and $t = 30 \text{ s}$.
9. Calculate the amount of work done by a force of 48N in moving an object through a distance of 10 m in the direction of force.
10. What will be the resulting kinetic energy of a body if its velocity is reduced to $v/4$?
11. What is the weight of the object that has gravitational potential energy of 3080 J and it is dropped from the height of 11 m?
12. What is the energy stored in a stone of mass 750 g kept at the top of a cabinet 1.5 m high?