

**Multiple Choice Questions**

- In science, work is said to be done when**
 - Force is applied
 - Force produces displacement
 - Energy is used
 - An object moves
- The SI unit of work is**
 - Watt
 - Joule
 - Newton
 - Pascal
- Work done is zero when the angle between force and displacement is**
 - 0°
 - 45°
 - 60°
 - 90°
- The energy possessed by an object due to its motion is called**
 - Potential energy
 - Chemical energy
 - Kinetic energy
 - Heat energy
- The formula for kinetic energy is**
 - mv
 - mgh
 - $\frac{1}{2}mv^2$
 - mg
- An object at height possesses**
 - Kinetic energy
 - Mechanical energy
 - Heat energy
 - Potential energy
- The commercial unit of electrical energy is**
 - Joule
 - Watt
 - Kilowatt-hour
 - Ampere
- One kilojoule is equal to**
 - 10 J
 - 100 J
 - 1000 J
 - 10,000 J
- The rate of doing work is called**
 - Energy
 - Power
 - Force
 - Momentum

10. A machine with efficiency 100%

- (a) Gives more output than input
(c) Has no energy loss

- (b) Gives less output than input
(d) Is practically impossible

Fill in the blanks :

11. The SI unit of power is _____.
12. An object having the capacity to do work is said to possess _____.

True / False

13. Work is a vector quantity.
14. Kinetic energy increases with increase in speed.

Very Short Type Questions

15. Define work in scientific terms.
16. Write the formula for power.

Short Type Questions

17. Why is work done by gravity on a freely falling object considered positive?
18. State two differences between kinetic energy and potential energy.

Essay Type Questions

19. Explain work done by a constant force and discuss the conditions under which work is positive, negative or zero.
20. Define energy. Explain kinetic energy and potential energy with examples and mathematical expressions.

HOTS

21. **Assertion (A):** A moving object always possesses energy.
Reason (R): A moving object can do work on another object.
- a) Both A and R are true and R is the correct explanation of A
b) Both A and R are true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true



1. (b) Force produces displacement
2. (b) Joule
3. (d) 60°
4. (c) Kinetic energy
5. (c) $\frac{1}{2} mv^2$
6. (d) Potential energy
7. (c) Kilowatt-hour
8. (c) 1000 J
9. (b) Power
10. (d) Is practically impossible
11. Watt
12. Energy
13. False
14. True
15. Work is said to be done when a force acting on an object produces displacement in the direction of the force.
16. Power = Work / Time.
17. When an object falls freely, the displacement is in the direction of gravitational force. Hence, work done by gravity is positive.
18. Kinetic energy is possessed due to motion, while potential energy is possessed due to position. Kinetic energy depends on speed, whereas potential energy depends on height.

19. In science, work is said to be done when a force applied on an object produces displacement in the direction of the force. If a constant force acts on an object and the object moves through a certain distance, the work done is equal to the product of force and displacement. Mathematically, work is given by the formula $W = F \times s$. Work can be positive, negative or zero depending on the direction of force and displacement. Work is positive when the force and displacement are in the same direction. For example, when a person pushes a box and the box moves forward, the work done is positive. Work is negative when the force acts opposite to the direction of displacement. For instance, when a ball thrown upward slows down due to gravity, gravity does negative work. Work is zero when there is no displacement or when the force acts perpendicular to displacement, such as a person carrying a load on a horizontal road. Thus, work depends on both force and displacement and their relative directions.

20. Energy is defined as the capacity of an object to do work. Whenever work is done, energy is transferred from one object to another. The SI unit of energy is joule.

Kinetic energy is the energy possessed by an object due to its motion. A moving car, flowing water and a flying bird possess kinetic energy. The kinetic energy of an object depends on its mass and speed and is given by the formula $KE = \frac{1}{2} mv^2$.

Greater the speed of an object, greater is its kinetic energy.

Potential energy is the energy possessed by an object due to its position or configuration. An object placed at a height, a stretched rubber band or compressed spring possesses potential energy. The potential energy of an object at a height is given by $PE = mgh$, where m is mass, g is acceleration due to gravity and h is height. Both forms of energy are interconvertible and together form mechanical energy.

21. Correct option: a

Explanation: A moving object has kinetic energy and can perform work on another object, which explains why it always possesses energy.