

## CLASS – 8 PHYSICS CHAPTER – 4 ENERGY [SOLUTIONS]

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### A. Choose the correct option.

1. Which of the following is said to be done, when a body undergoes displacement in the direction of the applied force?

Answer : (d) Work

2. Work is always done in the.....of application of force.

Answer : (b) Same direction

3. Which of the following is correct for work?

Answer : (a) It is a scalar quantity

4. The ability of a body to do work is called :

Answer : (a) energy

5. When there is no displacement even after application of a great force :

Answer : (c) no work is considered to be done

6. ....can neither be created nor destroyed but can be transformed from one form to another.

Answer : (a) Energy

7. Gravitational potential energy of an object depends on which of the following?

Answer : (c) Both (a) and (b)

8. This is the name of energy associated with motion of an object.

Answer : (c) Kinetic Energy

9. Energy is measured in

Answer : (d) none of these

10. Water in a tap from overhead tank flows due to.....potential energy.

Answer : (a) Gravitational

### B. Fill in the blanks.

1. Work is said to be done when a force acts on an object and the object is.....from its position.

Answer : displaces

2. Energy is defined as the.....of the body to do work.

Answer : ability/capacity

3. An object can do work equivalent to the.....it possesses.

Answer : energy

4. ...., just like matter cannot be created or destroyed.

Answer : Energy

5. The rate at which the work is done or energy is transmitted is called.....

Answer : power

6. Potential energy is the energy possessed by a body by virtue of its.....

Answer : position

7. Light energy is transformed into.....energy during the process of photosynthesis in the plants.

Answer : chemical

8. If the height of an object is doubled then the gravitational potential energy also gets.....

Answer : doubled

### C. Write T for True and F for False statements.

1. Energy can always be destroyed and created.

Answer : False

2. Work and energy have the same units.

Answer : True

3. Energy and moment of a force have the same units.

Answer : False

4. A ball thrown from a balcony possesses kinetic energy.

Answer : True

5. Kinetic energy is formulated by  $\frac{1}{2}mv^2$ .

Answer : True

6. If the mass of the object is doubled, its kinetic energy decreases by four times.

Answer : False

7. The formula for potential energy is  $mgh$ .

Answer : True

8. Kinetic energy is inversely proportional to the square of velocity of that object.

Answer : False

9. The formula for Power is Work done by a body/Time taken.

Answer : True

10. Unlike energy power cannot be stored.

Answer : True

#### D. Give one or two word answer.

1. It is said to be done when a force acts on an object and the object is displaced.

Answer : Work.

2. Capacity to do work.

Answer : Energy.

3. It neither can be created nor destroyed.

Answer : Energy.

4. The rate at which work is done.

Answer : Power.

5. S.I. unit of energy.....

Answer : Joule.

6. S.I. unit of power.....

Answer : Joule per second (J/s).

7. Equation for kinetic energy.....

Answer :  $\frac{1}{2} mv^2$

8. Equation for potential energy.....

Answer :  $mgh$

#### E. Answer the following questions in short.

1. What is work? Give SI units of work?

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

The SI unit of work is Joule (J).

2. Define energy.

Answer : The ability to do work is known as energy.

3. How are force and energy related?

Answer : When force is applied on an object, resulting in the movement of that object, work is said to be done. Work can be calculated using the formula, Work done is equal to product Force and Distance. The ability or the capacity to do work is called energy. So, that why energy and force are related to each other.

4. Give an example of an object with potential energy.

Answer : (i) River water at the top of a waterfall.

(ii) A book on a table before it falls.

(iii) A child at the top of a slide.

5. Write a short note on kinetic energy.

Answer : The kinetic energy (KE) of an object is the energy that it possesses due to its motion. It is defined as the work needed to accelerate a body of a given mass from rest to its stated velocity. Having gained this energy during its acceleration, the body maintains this kinetic energy unless its speed changes.

Mathematically, K.E. is represented as

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

6. Give an example of an object with kinetic energy.

Answer : (i) A moving cricket ball can do work in pushing back the stumps.

(ii) Moving water can do work in turning a turbine for generating electricity.

(iii) Moving wind can do work in turning the blades of windmill.

7. What are different types of potential energy?

Answer : There are two different types of potential energy are :

(i) **Gravitational Potential Energy** : The energy acquired by a body when it is raised at some height from the ground level is known as gravitational potential energy.

**(ii) Elastic Potential Energy :** The energy of a body due to a change in its shape and size is called elastic potential energy.

**8. State the type of transformation of energy in case of a light bulb.**

**Answer :** In bulbs or tubelight, electrical energy is converted into light energy.  
Electrical energy → Light energy

**9. What is a solar cooker?**

**Answer :** An apparatus for cooking food using the energy of direct sunlight, typically by means of reflective panels that concentrate the light on to a dark-coloured pot in an insulated box.  
Light Energy → Heat Energy

**10. Name the type of energy transformation taking place in case of loud speakers.**

**Answer :** Loud speakers convert electrical energy to sound energy.  
Electrical energy → Sound energy

**F. Answer the following questions in detail.**

**1. What do you mean by transformation of energy? Discuss four types of energy transformations, with examples.**

**Answer :** All forms of energy follow a universal law known as 'Law of Conservation of Energy' which states that 'energy can neither be created nor be destroyed, but transforms from one form to another'. This implies that all forms of energy are inter-convertible. The process of change of one form of energy into another is called as energy transformation.

**Examples : (i)** In the process of photosynthesis, plants convert the light energy of the Sun into chemical energy in the form of food.

**(ii)** Bulbs, tubelights, etc. convert electrical energy into light energy.

**(iii)** Automobile engine, fans, electric motors, etc. convert electrical energy to mechanical energy.

**(iv)** Microphones convert sound energy to electrical energy.

**2. Explain the work-energy relationship.**

**Answer :** You know that energy is the ability of a body to do work. So, there is a direct relationship between energy and work. For example, when an object is at height from the ground, it has a certain amount of potential energy. When you drop the object, it falls down because of the force of gravity. So, work is being done on the object. While falling down, its potential energy is gradually used up until it becomes zero (just when the object touches the ground). At any point during its fall, the amount of potential energy which is used up by the object is equal to the distance the object has travelled (work done).  
So,  
Work done by a body = Energy change in the body

**3. Write a note on gravitational potential energy.**

**Answer :** The energy acquired by a body when it is raised at some height from the ground level is known as gravitational potential energy. This energy is stored in the body due to the work done on it, when it is raised against the gravitational force.

The gravitational potential energy depends on the mass of the body and the height to which it has been lifted. Greater the mass or height of an object, more the potential energy it will have. Gravitational potential energy of a body above a reference point, say the surface of earth.

$$G.P.E. = m \times g \times h$$

where, m = mass of the body

g = acceleration due to gravity

h = height of the body

**4. Define energy and power. State the differences between them.**

**Answer : Energy :** The ability to do work is known as energy.

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

**Difference between Energy and Power :**

	<b>ENERGY</b>	<b>POWER</b>
<b>1.</b>	Energy is defined as the capacity to do work.	Power is defined as the rate at which work is done or energy is transmitted.
<b>2.</b>	Energy can transform from one form to another.	Power doesn't transform forms.
<b>3.</b>	We can store energy that is generated.	Power cannot be stored.
<b>4.</b>	SI unit of energy is joule (J).	SI unit of power is watt (W) or joules per second (J/s).