

Answer 3:- Work Energy and Power are the most used items in Physics. They are probably the first thing you learn in your Physics class. Work and energy can be considered and two side of same coin.

Work done is generally referred in relation to the force applied. While energy is used in reference to other factor.

Work:- Work is said to be done when a force applied to an object moves that object.

Formula :- $W = F \times d$.

Unit :- SI unit is Joule (J).

Energy:- In physics we can define energy as the capacity to do work.

Formula :- P.E = mgh .

Unit :- The SI unit of energy is Joules (J).

Power:- Power can be defined as the rate at which work is done i.e. energy converted.

Formula :- $P = W/t$.

Unit :- The unit is (W) watt.

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Work Energy and power

Work and energy

~~Work is the product~~

As we know from the law of conservation of energy: energy is always conserved.

Work is the product of force and the distance over which it moves.

Imagine you are pushing a heavy box across the room. The further you move the more work you do! If W is work, F the force and x the distance then.

$$W = Fx$$

Energy comes in many shapes. The ones we see over here are kinetic energy (KE) and potential energy (PE)

$$\text{Translational KE} = \frac{1}{2} m v^2$$

$$\text{Rotational KE} = \frac{1}{2} I \omega^2$$

Here I is the moment of inertia of the object (a simple manner in which one can understand moment of

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inertia is to consider it to be similar to mass in translational KE) and ω is angular velocity.

Gravitational PE = Mgh

Where h is the height of the object

Elastic PE = $\frac{1}{2} kL^2$

Where k is the spring constant (it gives how much a spring will stretch for a unit force) and L is the length by which the spring is stretched or compressed from the equilibrium position.

Power

Power (P) is Work (W) done in unit time (T)

$$P = W/T$$

- As work and energy (E) are same, it follows power is also energy consumed or generated per unit time.

$$P = E/T$$

In measuring power Horsepower is a unit which is in common use. However in physics we use watt. So the first thing to do in solving any problem related to power is to convert horsepower to Watt. 1 Horsepower (hp) = 746 Watts